

1,017,068.

7 SHEETS—SHEET 1.

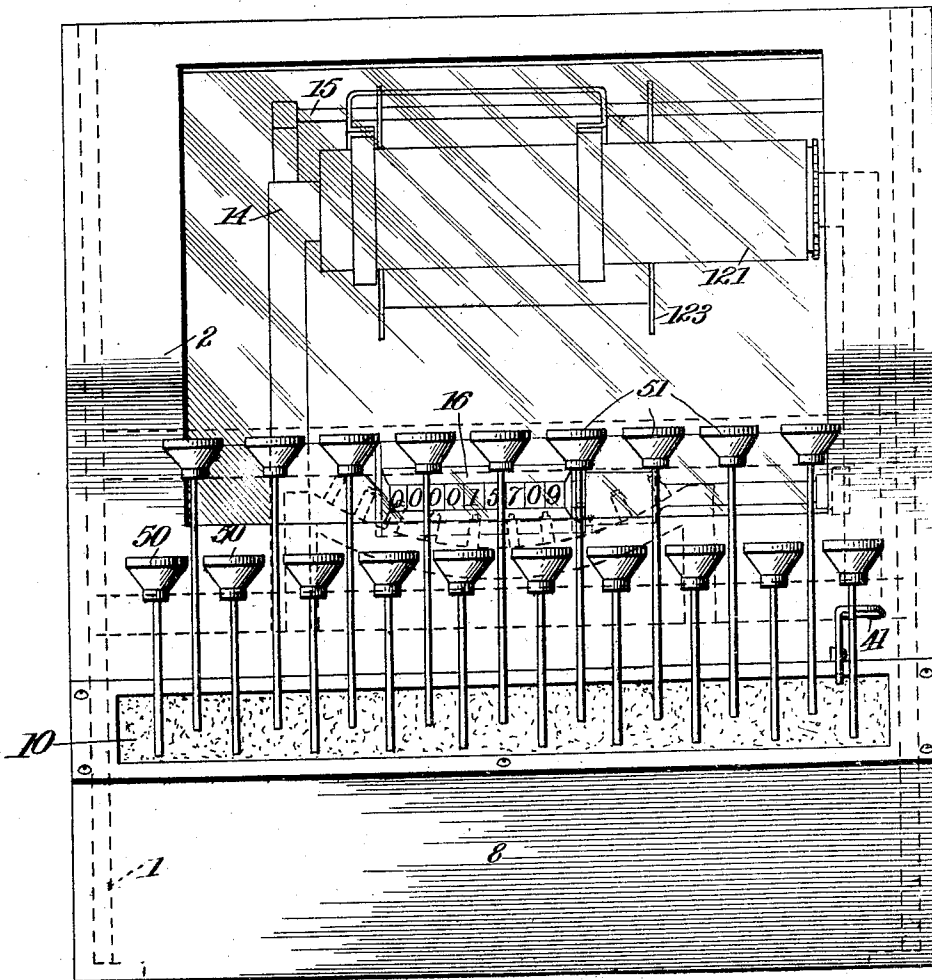


Fig. 1.

Witnesses

C. N. Walker.
M. Schaff

Inventor

Edwin Williamson

By

G. Howlett Davis

Attorney

E. WILLIAMSON.
 ADDING AND LISTING MACHINE.
 APPLICATION FILED DEC. 31, 1910.

Patented Feb. 13, 1912.

1,017,068.

7 SHEETS—SHEET 2.

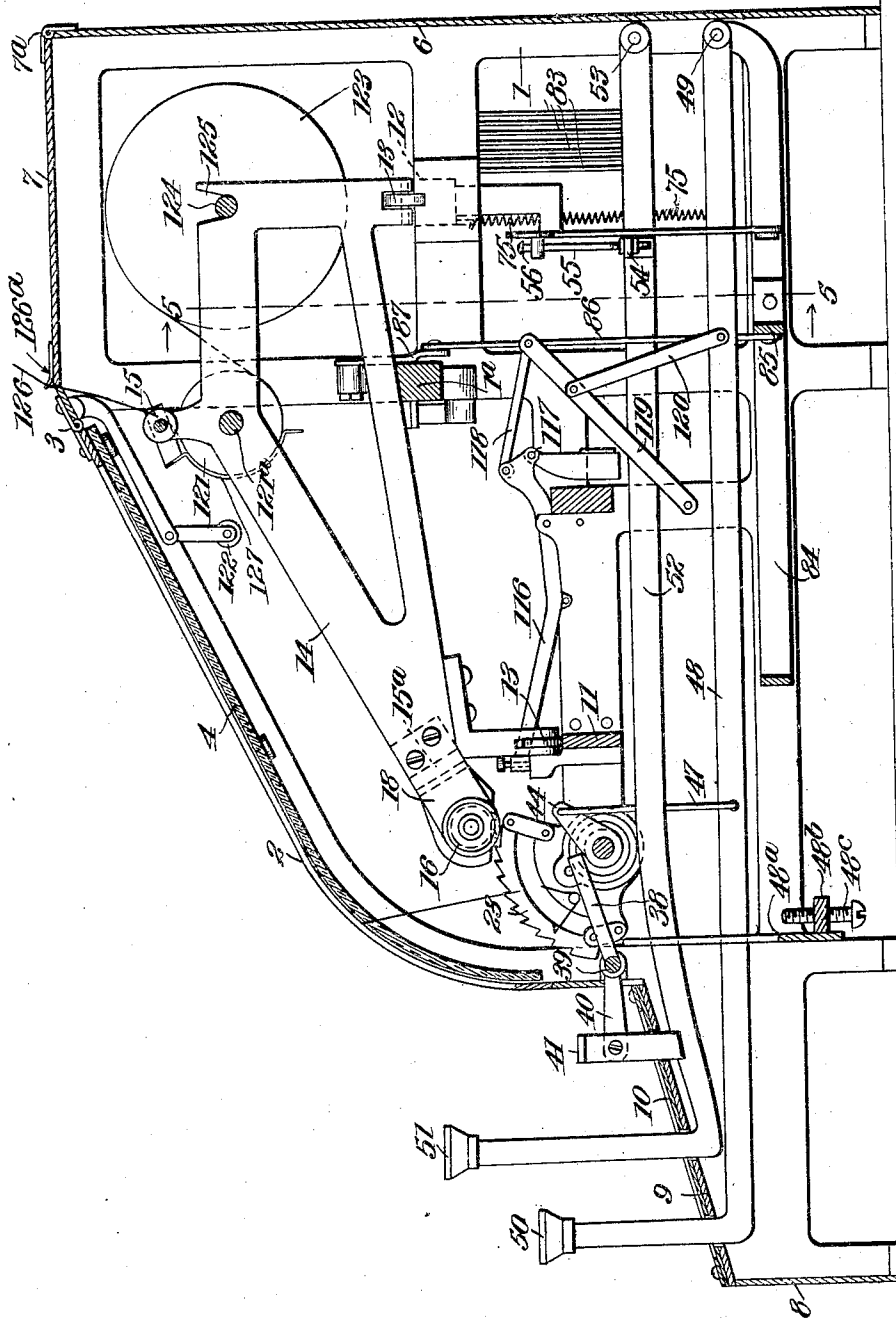


Fig. 2.

Inventor

Edwin Williamson

Witnesses

M. Wacker.
 J. M. Carroll.

234

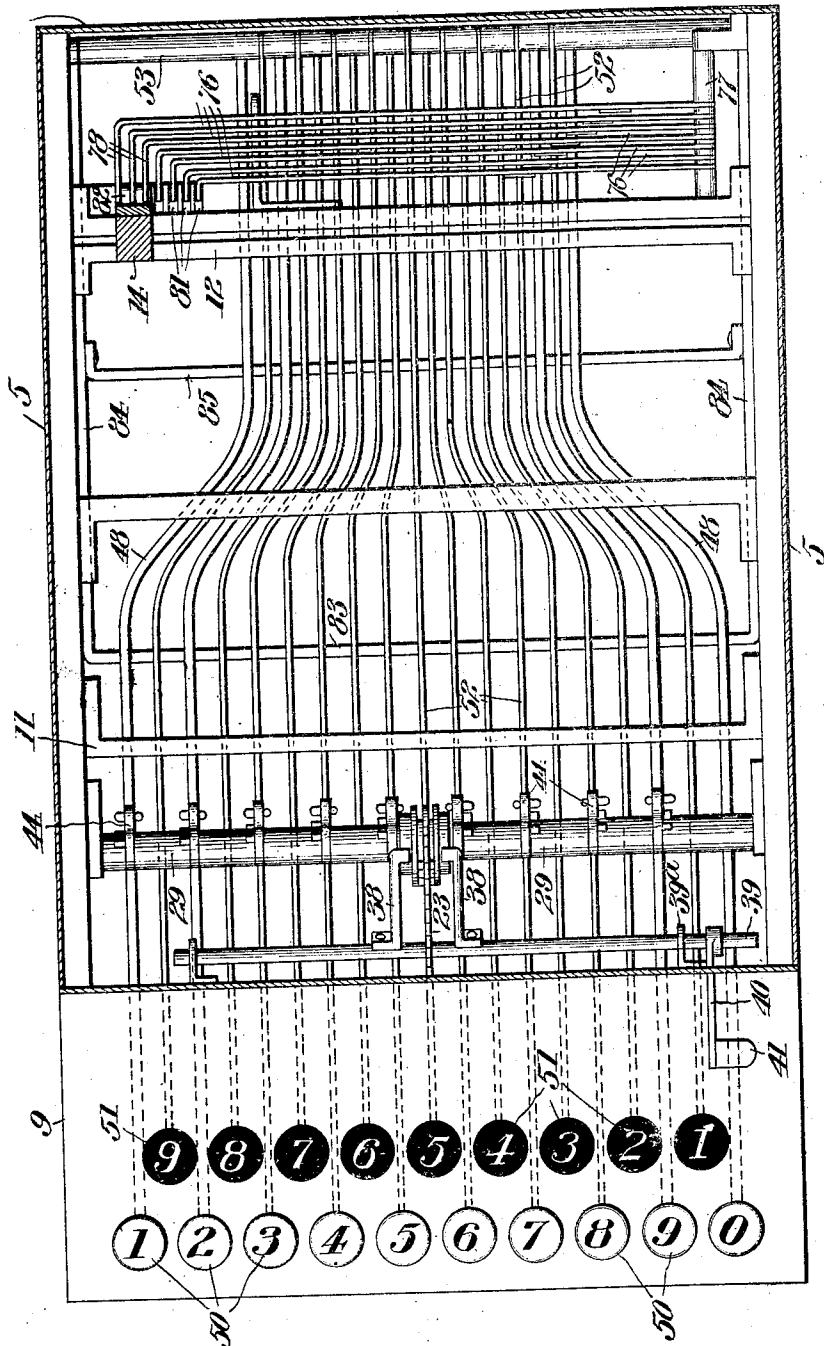
G. Howlett Durr
 Attorney

Patented Feb. 13, 1912.

7 SHEETS—SHEET 3.

1,017,068.

Fig. 3.



Inventor

Witnesses

C. Walker
J. M. Sirochoff

By

Edwin Williamson
J. Howlett Davis
 Attorney

E. WILLIAMSON.
 ADDING AND LISTING MACHINE.
 APPLICATION FILED DEC. 31, 1910.

1,017,068.

Patented Feb. 13, 1912.

7 SHEETS—SHEET 4.

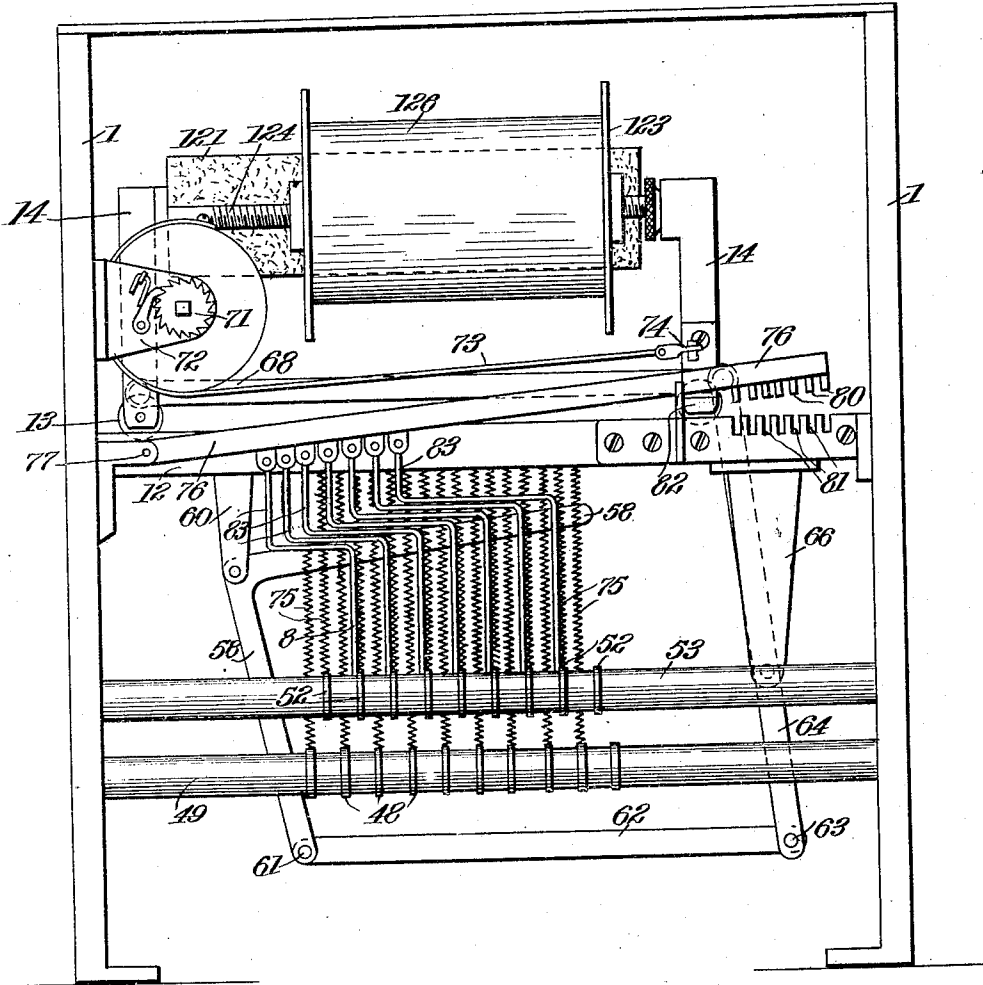


Fig. 4.

Inventor

Edwin Williamson

Witnesses

C. N. Walker.
 M. E. Choff

By

J. Howlett Davis

Attorney

E. WILLIAMSON.
 ADDING AND LISTING MACHINE.
 APPLICATION FILED DEC. 31, 1910.

1,017,068.

Patented Feb. 13, 1912.
 7 SHEETS—SHEET 5.

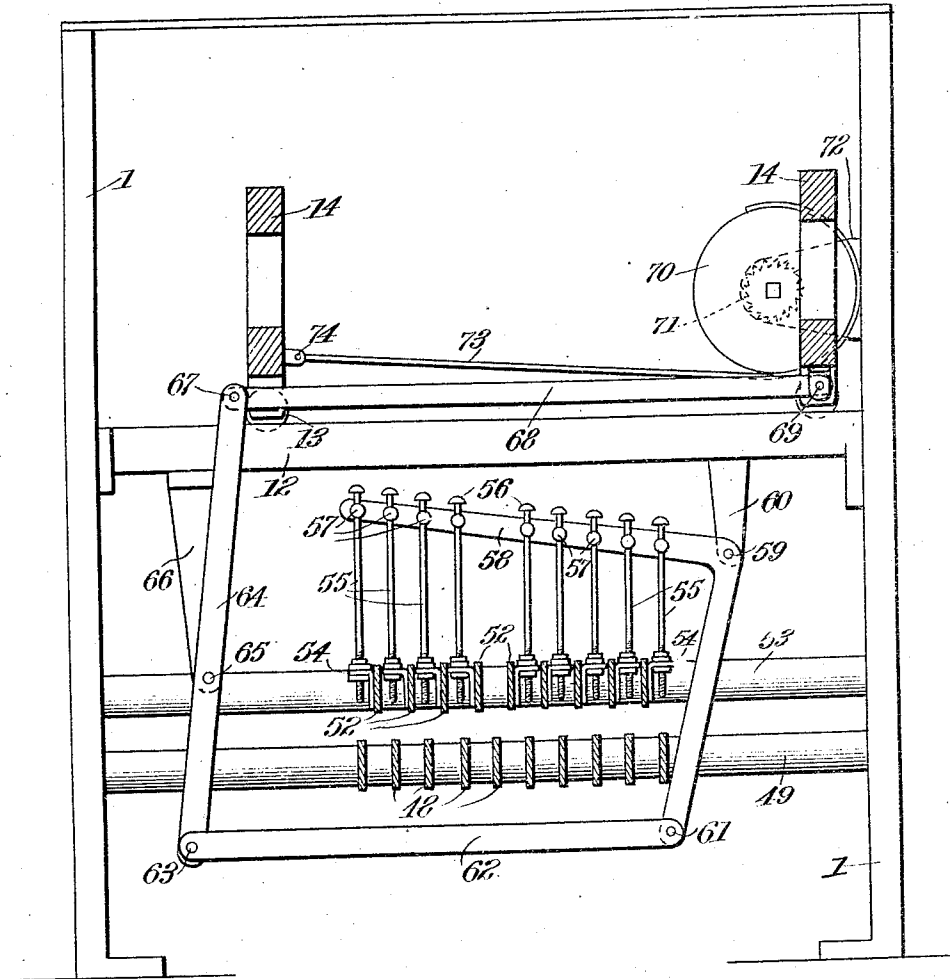


Fig. 5.

Inventor

Edwin Williamson

Witnesses

G. H. Walker,
 J. B. Schoff

By

J. Howlett Davis
 Attorney

E. WILLIAMSON.
 ADDING AND LISTING MACHINE.
 APPLICATION FILED DEC. 31, 1910.

1,017,068.

Patented Feb. 13, 1912.

7 SHEETS—SHEET 6.

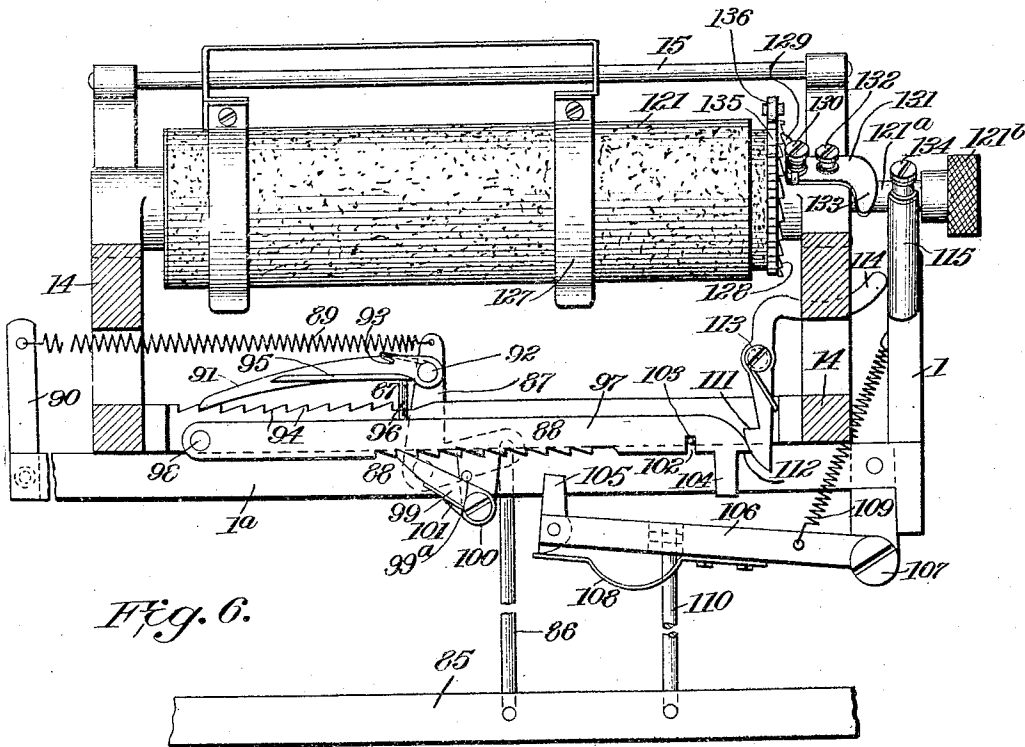


Fig. 6.

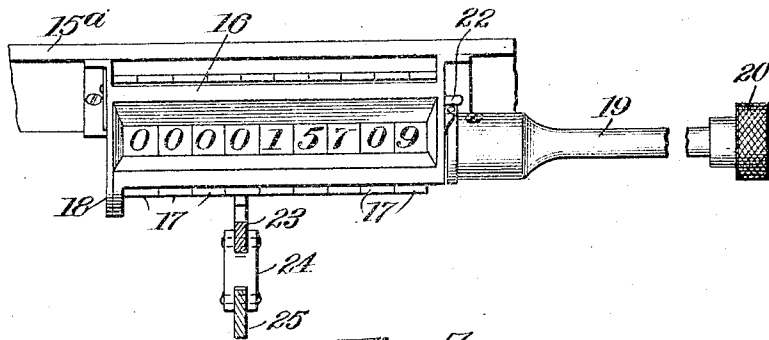


Fig. 7.

Inventor

Witnesses

C. M. Walker,
Chas. Banachoff

Edwin Williamson

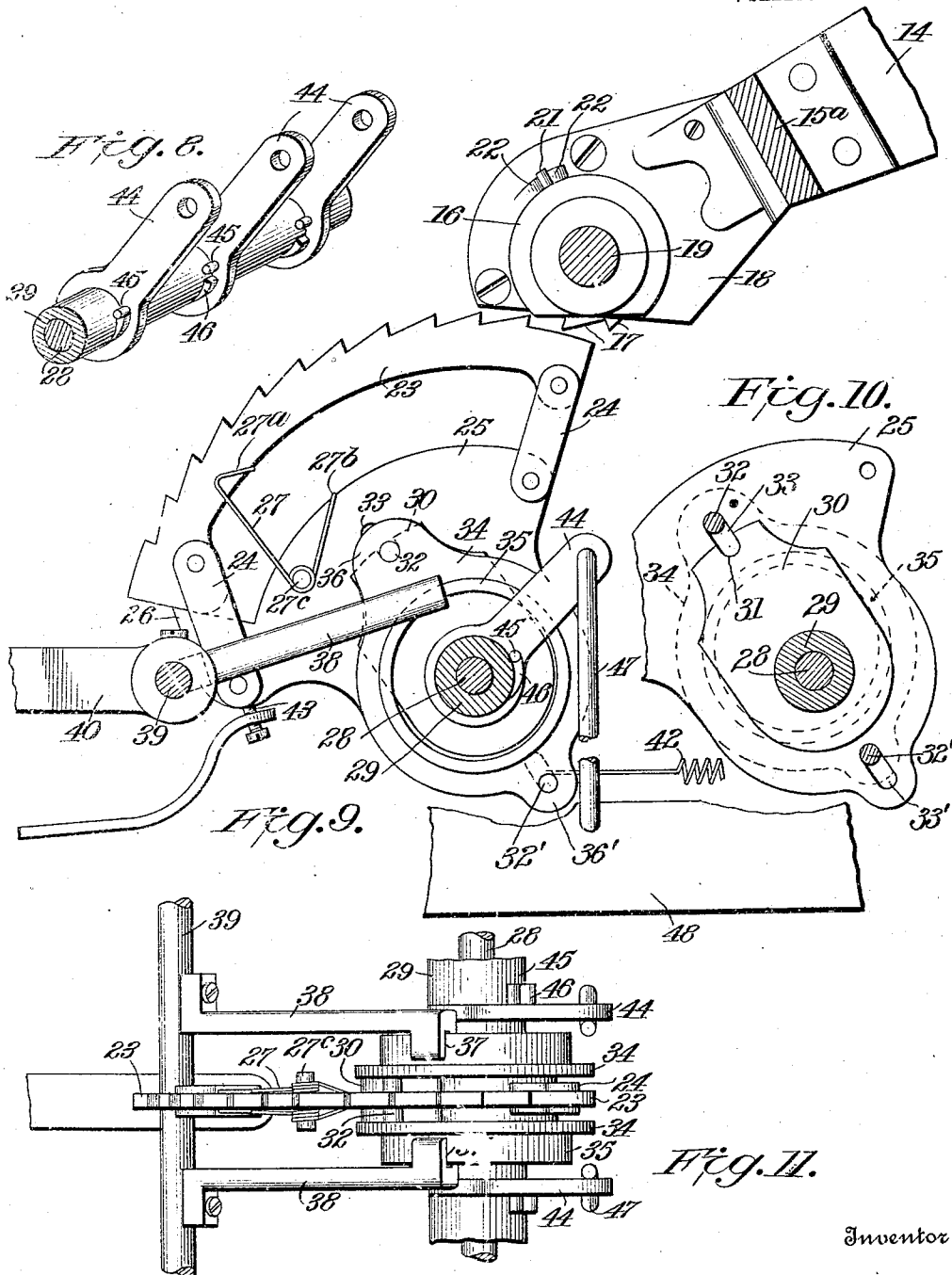
By G. Howlett Davis
 Attorney

E. WILLIAMSON.
 ADDING AND LISTING MACHINE.
 APPLICATION FILED DEC. 31, 1910.

1,017,068.

Patented Feb. 13, 1912.

7 SHEETS—SHEET 7.



Witnesses

C. M. Walter,
A. Broschhoff

Edwin Williamson

By

G. Howlett Davis

Attorney

UNITED STATES PATENT OFFICE.

EDWIN WILLIAMSON, OF TALLADEGA, ALABAMA.

ADDING AND LISTING MACHINE.

1,017,068.

Specification of Letters Patent.

Patented Feb. 13, 1912.

Application filed December 31, 1910. Serial No. 600,357.

To all whom it may concern:

Be it known that I, EDWIN WILLIAMSON, a citizen of the United States, residing at Talladega, in the county of Talladega and State of Alabama, have invented certain new and useful Improvements in Adding and Listing Machines, of which the following is a specification.

My invention relates to adding machines, and more particularly to a machine of this character in which is combined accumulating or totalizing mechanism with means for listing in tabular form the successive amounts registered by the totalizing mechanism.

Among the objects of the invention are to provide a machine of this type having comparatively few moving parts, and which shall be simple and compact in construction, and accurate in operation. To this end, there is provided only two rows or series of finger keys, the keys of one series serving to bring the registering and recording devices into the desired position, and the keys of the second series serving to actuate such devices after they have been shifted by the first mentioned keys. These two sets of keys I shall designate as "column keys" and "digit keys," respectively.

With the above general objects in view and to provide as far as possible, automatic mechanism for effecting the various operations, as well as to simplify and improve the details of construction, the invention consists in the arrangement and combination of parts hereinafter described and claimed, and illustrated in the accompanying drawings, in which,

Figure 1 is a front elevation of the complete machine; Fig. 2 is a vertical longitudinal section through the same, parts of the mechanism being shown in elevation; Fig. 3 is a horizontal section through the lower part of the machine, the mechanism being shown in plan view, and parts being omitted for the sake of clearness; Fig. 4 is a rear elevation of the machine, with the casing removed; Fig. 5 is a front elevation of the carriage shifting mechanism, the view being taken substantially along the line 5-5 of Fig. 2, looking in the direction of the arrow; Fig. 6 is a front elevation, on an enlarged scale, of the platen and carriage feed mechanism, parts being shown in section;

Fig. 7 is a front elevation of the totalizer, showing it attached to a portion of the carriage frame; Fig. 8 is a detailed perspective view of part of the totalizer operating mechanism, hereinafter described; Fig. 9 is a fragmentary side elevation, on an enlarged scale, of such mechanism, also showing an end view of the totalizer, parts being in section; Fig. 10 is a fragmentary elevation, similar to Fig. 9, showing the parts in shifted position; and, Fig. 11 is a plan view of the mechanism shown in Fig. 9, the totalizer being omitted.

Referring to the drawing in detail, the operating parts of my improved machine are supported by means of a main frame, comprising two side members designated in their entirety by the character 1.—Hinged to the frame at 3 is a front door or cover 2, having a glass front 4 through which the totalizer and listing mechanism may be seen. To the main frame are secured side plates 5 and rear plates 6, and top plate 7, hinged at 7^a to the rear plate, and a front plate 8, together forming a closed casing. Supported at the front of the machine is a table 9 provided with slots through which the operating keys project, and which is preferably provided with the usual felt cover 10. Extending between and supported by the side members of the main frame are a pair of cross beams 11 and 12. These beams serve as tracks or runways to support rollers 13, upon which a carriage, now to be described, is mounted. It will be observed that the track 12 is grooved so as to prevent lateral displacement of the rollers.

The carriage consists of a pair of side members 14 secured together by means of cross rods or bars 15, 15^a, as clearly shown in Figs. 6 and 7. Mounted on the carriage at the front thereof is a totalizer, or accumulating device designated in its entirety by the reference character 16. This device comprises a frame supported by end brackets 18, secured rigidly to the cross bar 15^a of the carriage. In these end brackets is journaled a shaft on which are mounted a plurality of digit wheels 17, which are all similar in size and shape and which, as clearly shown in Fig. 9, have ratchet teeth on their periphery. Each wheel has ten of such teeth, and on the face of each tooth is stamped or otherwise printed consecutively the digits

from 1 to 9, and a cipher. All of the wheels are similarly printed, and normally stand so that the cipher on each wheel appears at the sight opening in the totalizer casing. In the embodiment of the invention shown in the drawings, nine such digit wheels are provided, but it will, of course, be understood that any suitable number of wheels desired may be employed, according to the magnitude of the numbers which are to be added.

Extending from the end of the totalizer and forming a continuation of the central shaft thereof is a resetting rod 19, terminating in a knurled head 20, which is adapted to project through an opening in one of the side plates of the casing so that it may be grasped by the operator. Projecting radially from this rod adjacent the totalizer casing is a pin 21 which is normally adapted to rest in a notch formed by a pair of stop shoulders 22, one of which is beveled. When it is desired to reset the totalizer to zero the pin is withdrawn from this notch by pulling upon the rod 19. The rod may then be turned by means of the knurled head 20 so as to carry all of the wheels back to zero in the usual manner. The construction of the totalizer above described needs no further description, as it is well known and forms no part of my present invention.

In order to turn the wheels of the totalizer I provide a specially designed actuating device which is most clearly shown in Fig. 9. The device, which is segmental in its general shape, comprises an arc-shaped rack 23, having ratchet teeth adapted to engage the teeth of the digit wheels. This rack 23 is supported at each end by means of links 24 pivoted to a plate 25, the arrangement being such that the rack and plate lie in the same plane. Between the rack and plate is arranged a spring 27 which is coiled around a pin 27^a carried by the plate 25, and is formed with loop portions 27^a and 27^b arranged to straddle the opposite edges of the rack and plate, respectively. It will be seen that this spring serves to force the rack downwardly and backwardly as viewed in Fig. 9 so as to separate the parts as far as possible. This movement is limited by the engagement of the lower end of the rack with a lug 26, carried by the plate 25. The plate 25 is loosely mounted upon a shaft which extends across the main frame of the machine and comprises a core 28, and a series of sleeves 29 fitting said core, and rigidly secured thereto. Also rigidly secured to said shaft, and lying one on each side of the plate 25, are a pair of driving members 30, each provided, at its outer end, with a notch 31 which is adapted to receive and engage a pin 32. Arranged on each side of the driving members 30 are a pair of floating rings 34, arranged normally con-

centric with the shaft 28, and having outwardly projecting axial flanges 35, for a purpose hereinafter explained. Each of the rings 34 is provided with a pair of ears 36, 36', arranged on diametrically opposite sides thereof. One pair of these ears is rigidly connected by means of the pin 32, which passes through a slot 33 in the plate 25, while the other pair of ears is connected by a similar pin 32' which works in a slot 33' formed in a corresponding ear carried by the plate 25, and extending between the ears 36'. Arranged to loosely engage each of the axial flanges 35 is the bifurcated end of an arm 38, these arms being rigidly secured to a rock shaft 39 journaled in the main frame of the machine. Also secured to this rock shaft is an arm 40 which extends forwardly through the front wall of the casing, and is secured to a finger key 41 which is capable of vertical movement through a slot in the table 9. A spring 42, attached at one end to the pin 32' and at the other end to one of the cross bars of the main frame, serves to normally hold the actuating device in the position shown in Fig. 9, with the lower edge of the plate 25 resting against an adjustable stop 43 carried by the main frame.

From the foregoing description it will be observed that with the parts in the position shown in Fig. 9 the actuating device is coupled to the driving members 30 by reason of the engagement of the pin 32 with the notch 31, and that, therefore, when the shaft 28 is rocked, the plate 25 and rack 23 are carried forward so as to operate the digit wheels of the totalizer. It will be noted also that when the rack 23 is moved toward the right, as shown in Fig. 9, the ratchet teeth engage the teeth of the corresponding digit wheel and turn it, the rack being rigidly supported by means of the lug 26. On the return stroke, however, the links 24 permit the rack 23 to swing slightly downward against the tension of the spring 27, and the rack thus rides over the teeth of the digit wheels without turning them. It will be seen that this means of mounting the rack 23 results in its being rigidly supported against movement in one direction while being permitted to yield in the other direction, thus being operative only on its forward stroke. By depressing the key 41 the shaft 39 is rocked in its bearings, and the arms 38 operate to shift the rings 34, together with the pin 32, up into the position shown in Fig. 10, in which the pin no longer engages the notch 31. In this position it is obvious that the driving members 30 can move independent of the totalizer actuating device.

In order to rock the shaft 28, 29, and thus operate the totalizer, I mount a series of levers 44 loosely upon the shaft and provide each lever with a pin 45 extending axially

therefrom adjacent the shaft. Carried by each sleeve section 29 of the shaft is a lug 46, so arranged as to be engaged by the pin 45 of the corresponding lever 44. Each of these levers is connected as by means of a link or pull rod 47 with its corresponding key lever 48, these key levers being arranged near the bottom of the main frame of the machine and pivoted on a cross shaft 49 at the rear of the machine. At the front of the machine these key levers are bent upwardly at right angles and, after passing through slots in the table 9, terminate in keys 50. These are the digit keys, and bear upon their upper faces figures indicating the corresponding digit. As clearly shown in Fig. 3 there are ten of these keys, the same bearing the figures "1," "2," "3," etc. reading from left to right. It will, of course, be understood, however, that there is no connection from the "0" key to the rock shaft.

Referring to Fig. 8 it will be seen that the lugs 46 are disposed at progressively increasing distances from the pins 45, such distances increasing regularly from the lever corresponding with the "9" key to that corresponding with the "1" key. The key levers 48 are all the same length and have the same stroke, and the levers 44 all normally occupy the same angular position. It will therefore be seen that when the key corresponding to digit "2" for example, is depressed, the corresponding lever 44 will move through a considerable angle before engaging the corresponding lug 46 and thus rocking the shaft and moving the actuating device, while by depressing the key and lever corresponding to digit "9", for instance, there will be little or no lost motion between the pin and the lug. By virtue of this construction it will be observed that, for equal depressions of the digit keys 50, the rock shaft 28 and actuating device will be moved through very unequal angles, the angle being proportional to the value of the digit corresponding with the particular key depressed. Arranged under the key levers 48 near the front of the machine is a slotted guide plate 48^a and adjacent this plate is a transverse bar 48^b carrying stop screws 48^c which may be set to limit the downward movement of the key levers to any desired extent.

The mechanism so far described serves to actuate the totalizer after it has been moved to the proper position. In order to shift the carriage and totalizer into the desired relation with the actuating device 23 I provide a second series of keys, 51, which I shall designate as "column keys". As shown in the drawings, nine of these keys are provided, there being one for each of the digit wheels of the totalizer, but it will, of course, be understood that any desired number may be employed. The tops of these keys are

numbered 1 to 9 inclusive from right to left, as clearly shown in Fig. 3. These keys pass through slots in the table 9 and are carried by a corresponding set of key levers 52, pivoted at 53 to a shaft at the rear of the machine. Springs 75 extend between each of these levers and the cross rail 12 of the main frame. Similar springs are connected with the key levers 48 and serve to hold them in normal position.

Secured to each of the levers 52 near the rear of the machine is a lug 54, and to these lugs is adjustably secured a set of vertically extending links or rods 55, which pass loosely through apertured pins 57, carried by a bell crank lever 58, pivoted at 59 to a lug 60 secured to the main frame. To the other end of the bell crank lever 58 is pivoted at 61 a link 62, which is pivoted at its other end at 63 to the lower end of a lever 64, pivoted at 65 to a lug 66 carried by the main frame. To the upper end of the lever 64 is pivoted, at 67, a bar or link 68, the other end of which is attached at 69 to the lower side of the carriage frame 14. It will therefore be observed that when any of the key levers 52 are depressed they serve, through the medium of the links 55, to rock the bell crank 58 on its pivot 59 and thus pull the carriage to the left as viewed in Fig. 5, or to the right as seen in Fig. 4. It will also be observed that in order to permit freedom of movement there is considerable lost motion between the heads 56 of the rods 55 and the pins 57.

It will be noted that the pins 57 are arranged at progressively increasing distances from the pivot point 59 of the bell crank lever 58, the rod connecting with the key lever corresponding with column "1" at the right of the machine as viewed in Fig. 5, being nearest to the pivot point 59, and that connected with key lever corresponding with column "9", being most remote. A spring drum 70 is mounted in fixed lugs 72 and is provided with a pawl or ratchet tension regulating device 71. A strap 73 passes around the drum and is secured at its end to the carriage frame 14, as indicated at 74. This drum normally tends to hold the carriage in the position shown in Fig. 5; and when any column key is depressed the mechanism acting through bell crank lever 58 and link 68 serves to move the carriage to the left as viewed in Fig. 5 against the tension of the spring drum, so as to bring the corresponding digit wheel of the totalizer into co-operative relation with the actuating device. In the normal position of the parts the digit wheel corresponding to the ninth column is opposite the actuating device and it will therefore be seen that in order to bring the first column wheel into position, it is necessary to move the carriage through its entire range. Hence the necessity of connecting

key lever corresponding to column "1" close to the pivot point 59, of the bell crank lever, and the other key levers at correspondingly increasing distances therefrom.

- 5 In order to more accurately position the totalizer relative to the actuating device and to stop the carriage precisely at the desired point when it is moved as above described, by means of the column keys, I provide at
10 the rear of the machine a series of stop fingers 76. As clearly shown in Fig. 3, these fingers are pivoted at one end to a shaft 77 and are provided at their free ends with portions 78 bent at right angles to the bodies of
15 the fingers, and with downwardly turned lugs 80 projecting from the bottoms of these bent portions. These lugs 80 are arranged in transverse alinement and are adapted to enter notches 81 in a rack secured to the
20 main frame. A lug 82 is rigidly secured to the carriage frame 14 and is adapted to abut against the intumed portion 78 of any one of the fingers, the engagement of the corresponding lug 80 with the fixed rack serving
25 to render that particular finger absolutely rigid so as to withstand the impact of the carriage. The fingers 76 are connected with the corresponding column key levers by means of links or rod 83, as clearly shown
30 in Fig. 4, the arrangement being such that when any particular column key is depressed to shift the carriage, the corresponding stop finger is lowered so as to engage the lug 82 and stop the carriage accurately at the
35 proper point.

- In addition to the above described means for shifting the carriage to the desired point for registering the first figure of the number being added, it is necessary to provide
40 means for automatically moving the totalizer step-by-step as the digit keys are operated, so that the successive digit wheels may be brought into position to register the other figures of the number. To this end, I provide a U-shaped frame 84, and pivot the
45 free ends of the legs to each end of the shaft 49. Extending across this frame transversely of the machine is arranged a cross bar 85 which, as will be seen from an inspection of
50 Fig. 2, lies just beneath the key levers 48, so that when any of these levers are depressed, they will carry with them the cross bar 85 and frame 84, causing it to pivot about the shaft 49. Extending upwardly from the
55 cross bar 85 and pivoted thereto, is a pull rod 86, which is connected at its upper end to one arm of a bell crank lever 87, pivoted at 88 to a cross bar 1^a of the main frame. To the other end of this lever is connected
60 one end of a stout helical spring 89, the other end of which is attached to a fixed bracket 90. Also pivoted at 92 to the upper end of the bell crank lever 87 is a pawl 91, arranged with a spring 93 bearing thereon, which
65 spring serves to urge the end of the pawl

into engagement with a rack 94 secured to the carriage frame. Extending laterally from the side of the pawl 91 is a wing 95, which is normally just out of engagement with the top of a pin 96, set into a rack 97, 70 pivoted at 98 to the rack 94. Pivottally mounted on a lug 100, secured to the bar 1^a, is a pawl 99 which is urged by a light spring 101 into engagement with the teeth of the rack 97. It will be noted that the ratchet 75 teeth of the two racks 94 and 97 face in opposite directions.

Near the right hand end of the pivoted rack 97 is a notch 102 which is normally adapted to rest on a pin 103 carried by the rack bar 80 94 of the carriage, and by this means the rack bar 97 is supported in the position shown in the drawings. Depending from the lower side of the rack bar 97 adjacent its end, is a lug 104. This lug is adapted 85 to be engaged at times by a pawl 105 pivoted to the free end of a lever 106, which, in turn, is pivoted at 107 to the main frame of the machine. A leaf spring 108 bears against the lower end of the pawl 105, and 90 yieldingly maintains it in the position shown in Fig. 6. A spring 109 is attached at one end to the lever 106 and at the other end to the main frame 1, and serves to hold said lever up in the position shown. This 95 lever is controlled in its movements by means of a pull rod 110 which is pivottally secured thereto and which is attached at its lower end to the bar 85.

A hook 111 is pivoted to the carriage 100 frame at 113, and is adapted to engage underneath the projecting end 112 of the rack bar 97 after such bar has been lifted as hereinafter described. This hook is urged 105 toward the rack bar by means of a light spring, and is provided with a tail piece 114 projecting at an angle to the body of the hook and so located as to be engaged by a stud 115 secured to the main frame of 110 the machine, when the carriage is at the right hand limit of its travel.

In order to make a printed record of the numbers as they are registered on the totalizer, I provide a series of type bars 116, 115 (Fig. 2), pivoted at 117 to a support, and connected by means of suitable mechanism 118, 119, 120 to the digit key levers 48. These type bars are adapted to strike against a platen 121 mounted on a shaft 121^a in the carriage frame, which shaft is 120 provided at its end with a knurled head 121^b by means of which the carriage may be turned, the type, on their way to the platen, engaging a suitable inking mechanism, such as a freely suspended inking roller 122. A 125 reel 123 secured to a shaft 124, which lies in bearing notches 125 in the carriage frame, carries a strip of paper 126 which, as clearly shown in Fig. 2, is carried around the platen 121, underneath the rod 15, and out through 130

a slot in the top of the casing, a serrated cutter 126* being located adjacent the slot for conveniently severing the strip. The usual spring arms 127 embrace the platen 5 and guide the strip thereover.

At the right hand end of the platen is arranged an annular rack or ratchet wheel 128 adapted to be engaged by a spring pressed pawl 129, mounted on a stud 130, carried by a lever 131, pivoted at 132 to the carriage frame and provided with a projecting tail piece 133, which is arranged to impinge against a stud 134, secured to the main frame of the machine.

15 The operation of the carriage mechanism is as follows: Each time that a digit key is depressed the bell crank lever 87 is rocked by means of the pull rod 86 and draws the pawl 91 back so that it engages another 20 notch of the rack 94. When the key is released the spring 89 returns the bell crank 87 to normal position, and in so doing, moves the rack 94 and carriage through the space of one ratchet tooth. This operation 25 is repeated, the pawl 99 serving to hold the carriage in shifted position against the tension of the spring drum. After the units wheel of the totalizer has been actuated, the pawl 105, which is vibrated up and 30 down at every stroke of a digit key, engages under the lug 104, and lifts the rack bar 97 so that the hook 111 engages the projecting end 112 and holds the bar in raised position. In this position the pawl 99 no longer en- 35 gages the teeth of the rack, being held by a pin 99*, while the pin 96, engaging the wing 95, lifts the pawl 91 out of engagement with the rack 94. This leaves the carriage free and it is thereupon automatically 40 returned by the spring drum to its extreme right hand position. As it reaches this position, the tail 114 of the hook 111 strikes the stud 115 and is thereby rocked on its pivot, thus releasing the rack bar 97 and 45 allowing it to again fall to the position shown in the drawings. At the same time the tail 133 of the lever 131 engages the stud 134 and is thereby rocked on its pivot 132 in such a manner as to cause the pawl 50 129 to drive the ratchet wheel 128 a space of one tooth, thus automatically turning the platen and shifting the paper strip to the extent of a line space. The platen is held in shifted position by the engagement of 55 a spring pressed roller 136 with a toothed wheel 135, as is usual.

The operation of the machine as a whole will now be readily understood. Suppose, for example, that the first number to be 60 listed is "2549." This is a four place number, and therefore the first digit wheel to be operated will be in the fourth column. The first act of the operator therefore is to depress column key No. "4." This serves to 65 shift the carriage to such a position that the

fourth digit wheel of the totalizer is brought opposite the actuating rack 23, and the carriage is accurately stopped in this position by means of the engagement of the lug 82 with the corresponding stop finger 76. The 70 next act of the operator is to depress digit key bearing the numeral "2." This has the effect of rocking the shaft 28 and thus moving the rack 23 through such an angle as will cause it to move the digit wheel of the 75 totalizer so that the numeral "2" will appear at the sight opening. As this digit key is released the pawl 91 shifts the carriage so as to bring the next digit wheel of the totalizer opposite the actuating device. The 80 digit keys numbered "5", "4", and "9", are then, all in the order named, consecutively depressed, and upon each depression the rock shaft and actuating device are moved through such an angle as will bring the cor- 85 responding numeral on the respective digit wheel of the totalizer into view at the sight opening. As the last digit key is released the trip mechanism automatically disengages the rack bars of the carriage from 90 the pawls and the spring drum draws the carriage to the right, thus bringing into play the pawl restoring mechanism and the line spacing mechanism above described, and the machine is ready for recording the next 95 number. We will suppose that this number is "73,862." As this is a five place number column key numbered "5" is first depressed so as to bring the fifth digit wheel of the 100 totalizer into operative position relative to the actuating device. The five proper digit keys are then depressed one after another, and the number so recorded is automatically added by the totalizer to that previously 105 registered, the figures visible through the sight opening of the totalizer representing the sum of the two numbers so far listed. In the same way any desired number of items may be registered one after the other, and at the same time these items are listed 110 by the printing mechanism upon the strip of paper 126. After having listed the last item, the total may be read from the totalizer, and, if it is desired to record this total upon the paper, the key 41 is depressed, thus 115 disconnecting the totalizer actuating device from the rock shaft and permitting the digit keys to be used to operate the printing mechanism while the totalizer remains at rest. 120

It will thus be seen that I have provided a combined adding and recording machine which requires a minimum number of manual operations and which has comparatively few moving parts, and it is thought 125 that the many advantages of my improved machine will be readily appreciated by those familiar with such matters.

What I claim is:

1. In a machine of the class described, a 130

totalizer, an actuating device therefor, a rock shaft on which said device is mounted, a series of levers pivotally mounted on said shaft, a pin carried by each lever, a lug on the shaft adjacent each lever, adapted to be engaged by the corresponding pin, and means for selectively moving said levers, the distance between each pin and its corresponding lug varying progressively from one end of the series to the other.

2. In a machine of the class described, a totalizer, an actuating device therefor, a rock shaft on which said device is mounted, a set of digit key levers, a second series of levers pivoted at one end to said shaft and each connected at the other end with one of said key levers, and a lost motion connection between each of such pivoted levers and said shaft, the amount of such lost motion for each lever being inversely proportional to the value of the corresponding digit.

3. In a machine of the class described, the combination with a totalizer comprising a set of digit wheels, of an actuating device therefor, said device comprising a plate, a shaft on which said plate is mounted, an arc-shaped rack having teeth on the outer edge thereof, a pair of links pivotally connecting said rack with said plate, a spring confined between said plate and the inside of said rack, and tending to force them apart, and means serving to limit the pivotal movement of said rack and links in one direction whereby, on the forward stroke of the actuating device, the teeth of said rack will engage the periphery of said digit wheels to shift them, while on the reverse stroke, said spring will yield and permit such teeth to slide over said wheels without operating them.

4. In a machine of the class described, the combination with a totalizer comprising a set of digit wheels, of an actuating device therefor arranged to engage and shift said wheels, a shaft on which said actuating device is mounted, and means for locking said shaft and actuating device together at times, and for permitting said shaft to move independent of said actuating device at other times.

5. In a machine of the character described, the combination with a totalizer, of an actuating device therefor, such device comprising a plate, a shaft on which such plate is loosely mounted, a driving member rigidly secured to said shaft adjacent said plate, said driving member having a notch, and said plate having a slot, a pin passing through said slot, and means for shifting said pin in said slot into and out of engagement with the notch in said driving member, whereby said parts may be locked together or disconnected, as desired.

6. In a machine of the character de-

scribed, the combination with a totalizer, of an actuating device therefor, a rock-shaft adapted to operate said actuating device, a clutch device between said shaft and said actuating device, and means for operating said clutch device so that said parts may be locked together or disconnected, as desired.

7. In a machine of the character described, the combination with a totalizer, of an actuating device therefor comprising an arc-shaped rack, a rock-shaft, means for loosely supporting said rack on said shaft in concentric relation therewith, a clutch device on said shaft adjacent said rack, and means for shifting parts of said clutch device so as to disconnect or lock together said shaft and rack, as desired.

8. In a machine of the class described, the combination with a main frame, of a carriage movable thereon, a totalizer mounted on said carriage and comprising a set of digit wheels, a totalizer actuating device mounted on said frame, column keys for selectively moving said carriage and totalizer into any desired predetermined position relative to said actuating device, means for imparting successive movements to said actuating device to operate said totalizer, means for automatically shifting said carriage step-by-step after each actuation of the totalizer, and means for automatically returning the carriage and totalizer to normal position immediately after the actuation of the units wheel of the totalizer.

9. In a machine of the class described, the combination with a main frame, of a carriage movable thereon, a totalizer mounted on said carriage and comprising a set of juxtaposed digit wheels, a totalizer actuating device mounted on said main frame and adapted to engage and turn any of said digit wheels, means for moving said carriage so as to bring into coöperative relation with said actuating device that particular digit wheel corresponding with the position of the first figure of the number to be registered, means for moving said actuating device so as to operate such digit wheel and for simultaneously shifting said carriage so as to bring the next digit wheel into position to be engaged by the actuating device, means for operating each successive digit wheel and similarly shifting the carriage step-by-step, and means for automatically returning said carriage to normal position after the units wheel has been thus operated.

10. In a machine of the class described, the combination with a main frame, of a carriage movable thereon, a totalizer mounted on said carriage and comprising a set of juxtaposed digit wheels, a totalizer actuating device mounted on said frame and adapted to engage and turn any of said

digit wheels, a set of column keys, and connections whereby when any key is depressed, the carriage is moved so as to bring the corresponding digit wheel into coöperative relation with said actuating device, a set of digit keys, means operated thereby for imparting a step-by-step movement to said carriage so as to successively bring each digit wheel after the first into operative relation with said actuating device and for simultaneously moving said actuating device so as to cause it to operate said wheels, and means arranged after the last of said wheels has been thus operated, to automatically move said carriage in a direction opposite to said step-by-step movement.

11. In a machine of the class described, the combination of a main frame having a runway, a carriage movable along such runway, means for normally maintaining said carriage at one end of said runway, a totalizer mounted on said carriage, an actuating device therefor mounted on said main frame, a set of key levers pivoted to said main frame, means operated by each of said key levers for moving said carriage from normal position to a corresponding predetermined position so as to bring said totalizer into desired relation with said actuating device, and a series of stop fingers also operated by said key levers and arranged to engage said carriage and stop it accurately in the desired position.

12. In a machine of the class described, the combination with a totalizer comprising a set of digit wheels, of an actuating device therefor, said actuating device being adapted to engage and turn any of said digit wheels, said totalizer being mounted for movement relative to said actuating device, means for selectively shifting said totalizer so as to bring it into any desired predetermined position relative to said actuating device, means for imparting successive movements to said actuating device to operate the digit wheels of said totalizer, means for automatically shifting said totalizer step-by-step, after each such operation, and means for automatically returning said totalizer to normal position after the actuation of the units wheel thereof.

13. In a machine of the class described, a totalizer comprising a set of digit wheels, and a totalizer actuating device, said device being adapted to engage and turn any of said wheels, one of said parts being mounted for movement relative to the other, means for selectively shifting the movable part so as to bring said parts into any desired predetermined relative position, a set of keys for imparting successive movements to said actuating device to operate the digit wheels of said totalizer, means for automatically shifting said movable part step-by-step after each such operation, and means for auto-

matically returning said movable part to normal position after the actuation of the units wheel of the totalizer.

14. In a machine of the class described, the combination with a movable carriage, of a totalizer mounted thereon and comprising a set of digit wheels, a totalizer actuating device adapted to engage and turn any of said wheels, column keys for selectively moving said carriage so as to bring said totalizer into any desired predetermined position relative to said totalizer actuating device, digit keys for imparting successive movements to said actuating device to operate the digit wheels of said totalizer, means for automatically shifting the carriage step-by-step at each actuation of any of said digit keys, and means for automatically returning the carriage and totalizer to normal position immediately after the actuation of the units wheel of said totalizer.

15. In a machine of the class described, the combination with a main frame, of a totalizer bodily movable relatively thereto and comprising a set of digit wheels, a totalizer actuating device pivotally mounted on said main frame and adapted to engage and turn any of the digit wheels of said totalizer, means for selectively shifting said totalizer on the main frame so as to bring it into any desired predetermined position relative to said actuating device, means for imparting successive pivotal movements to said actuating device to operate said digit wheels, means for automatically shifting said totalizer relative to said frame step-by-step after each such operation, and means arranged, after the units wheel of said totalizer has been thus operated, to automatically move said totalizer in a direction opposite to said step-by-step movement.

16. In a machine of the class described, the combination with a main frame, of a carriage movable thereon, a cylindrical platen rotatably mounted on said carriage, a set of column keys, connections whereby, when any key is depressed, the carriage is moved to a corresponding predetermined position, a set of digit keys, means for automatically shifting said carriage step-by-step at each actuation of any of said digit keys, means for automatically returning the carriage to normal position after the last of a given series of such actuations, and means operating, upon such return of the carriage, to automatically rotate said platen through a predetermined angle.

17. In a machine of the class described, the combination with a main frame, of a carriage movable thereon, a cylindrical platen rotatably mounted on said carriage, a totalizer also mounted on said carriage, a totalizer actuating device mounted on said frame, a set of column keys, and connections whereby, when any key is depressed, the

carriage is moved so as to bring said total-
izer into any desired predetermined position
relative to said actuating device, a set of
digit keys, type bars connected therewith
5 and carrying type arranged to strike against
said platen, means operated by said digit
keys for imparting successive movements to
said actuating device to operate the total-
izer and to simultaneously operate said type
10 bars, means for automatically shifting said
carriage step-by-step after each actuation of
any of said digit keys, means for automati-

cally returning the carriage to normal after
the last of a given series of such actuations,
and means operating upon such return of 15
the carriage to automatically rotate said
platen so as to produce the proper line space.

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

EDWIN WILLIAMSON.

Witnesses:

W. R. BRANNON,

W. H. LAUR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."