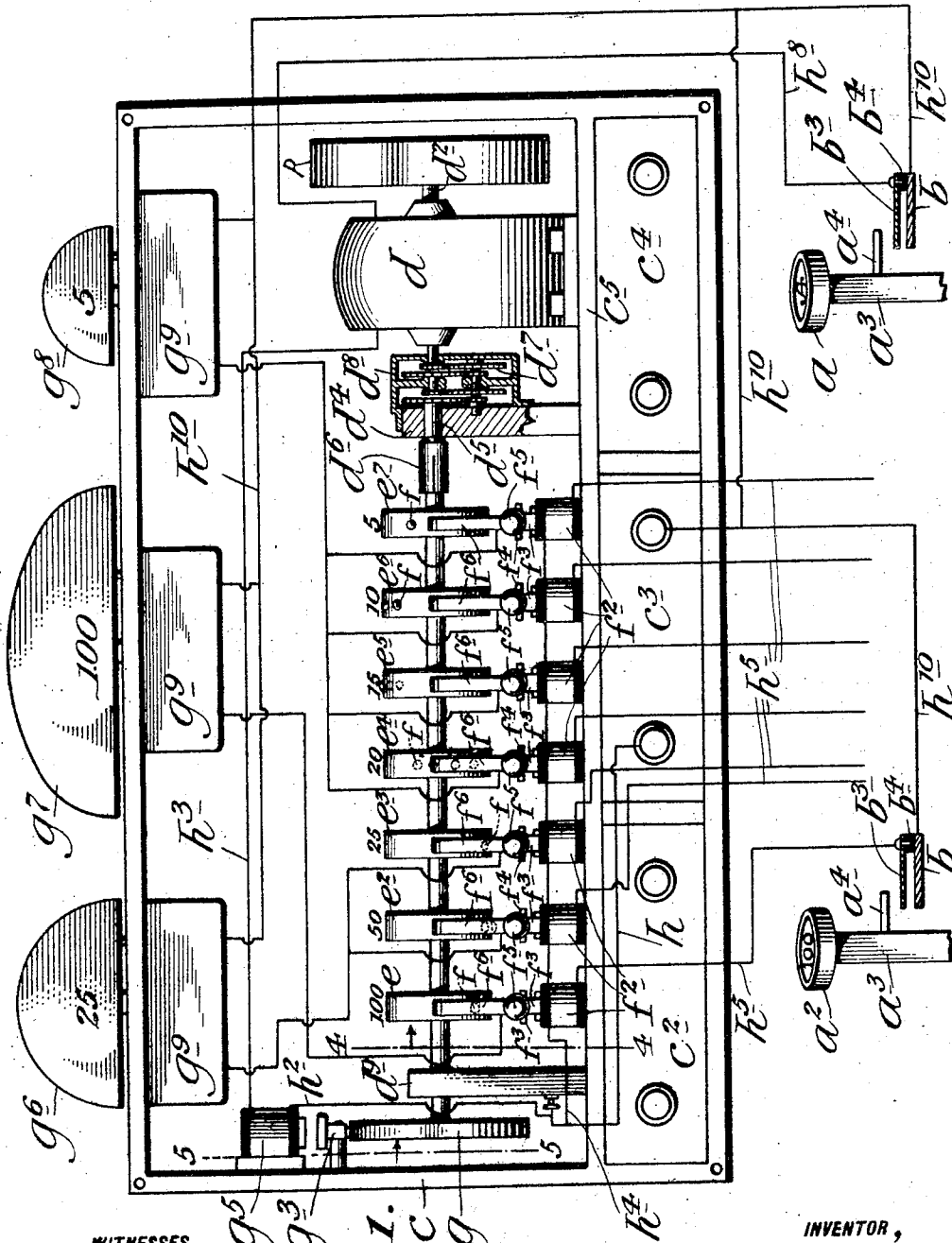


T. J. SULLIVAN.
ELECTRICAL ANNOUNCING ATTACHMENT FOR CASH REGISTERS.
APPLICATION FILED NOV. 7, 1907.

1,053,116.

Patented Feb. 11, 1913.

4 SHEETS—SHEET 1.



WITNESSES
C. E. Mulreany
W. C. Doodys

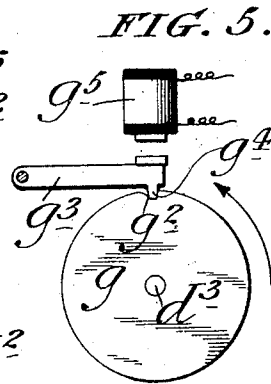
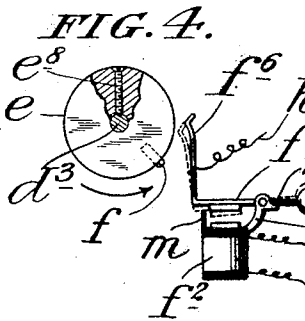
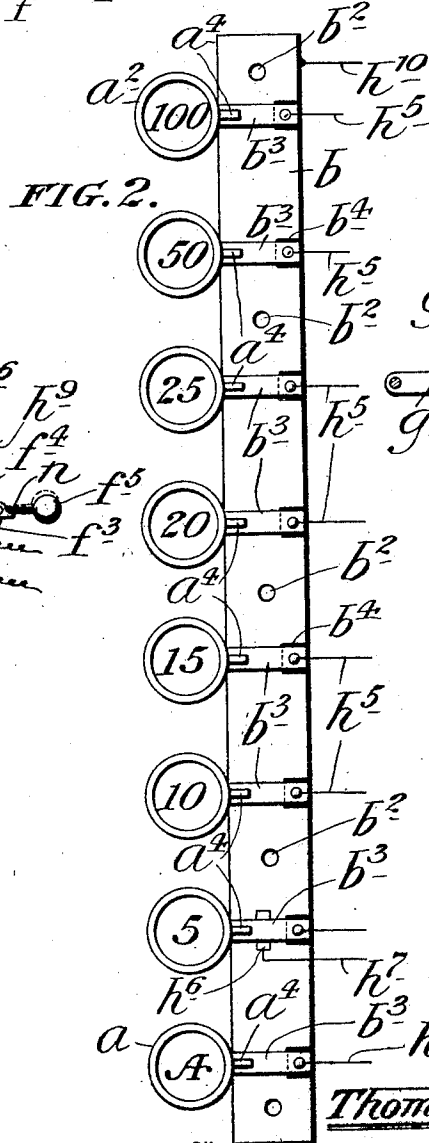
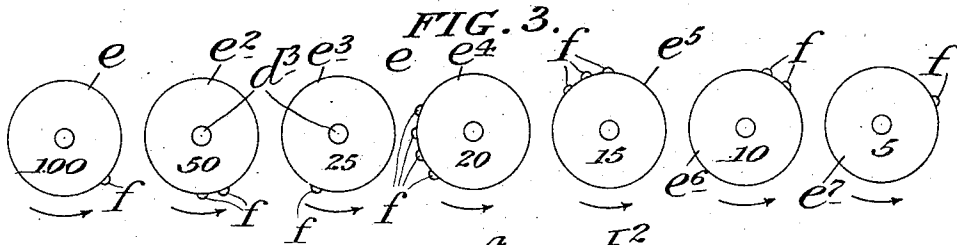
FIG. 1.

INVENTOR,
Thomas J. Sullivan,
BY
Edgar Tate & Co.
ATTORNEYS.

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4 SHEETS—SHEET 2.



WITNESSES
C. E. Mulheany
M. E. Dooly

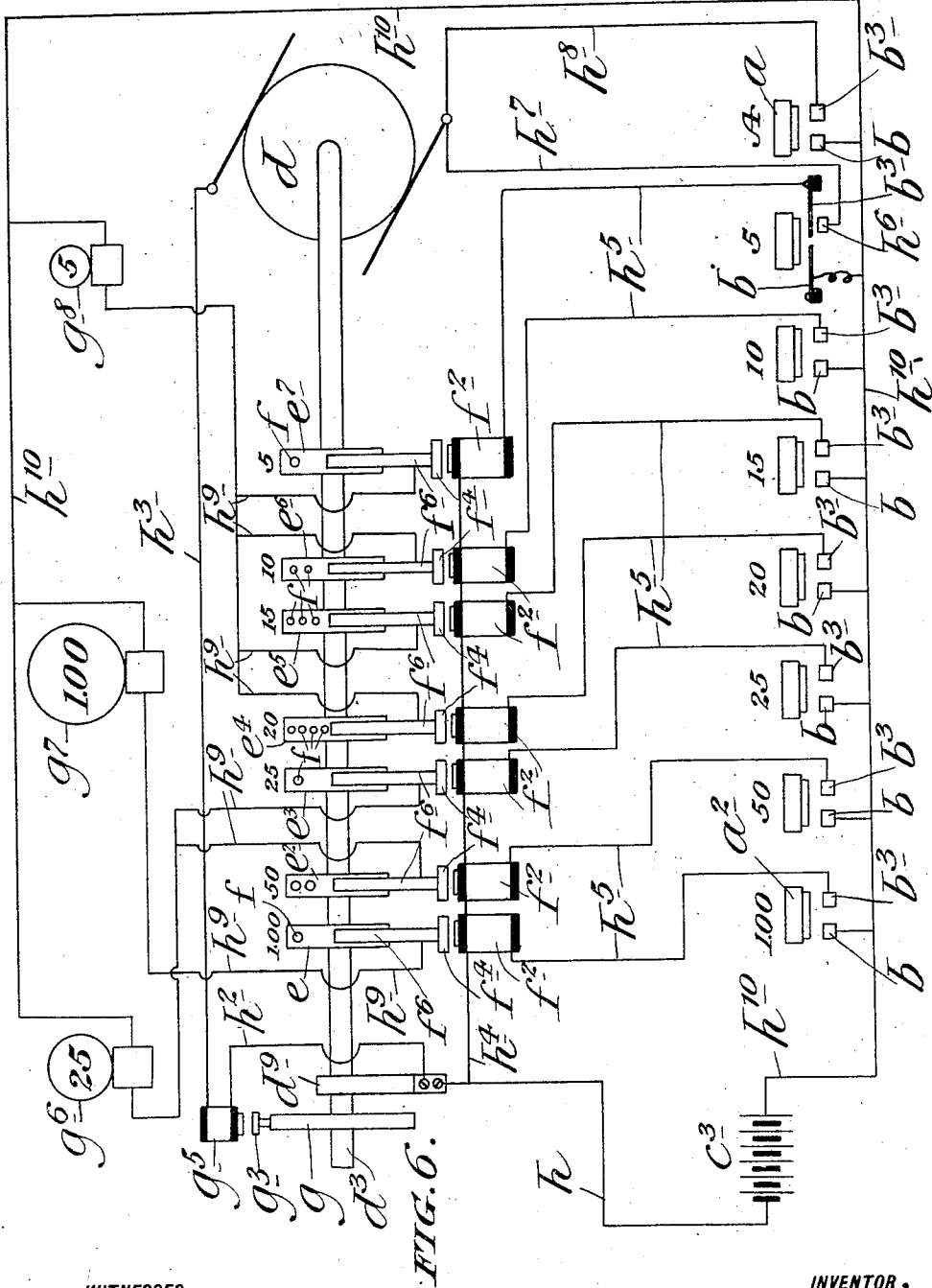
INVENTOR,
Thomas J. Sullivan,
BY Edgar Tate & Co.
ATTORNEYS.

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4 SHEETS-SHEET 3.



WITNESSES
C. E. Ombresmy
M. O. Dandy

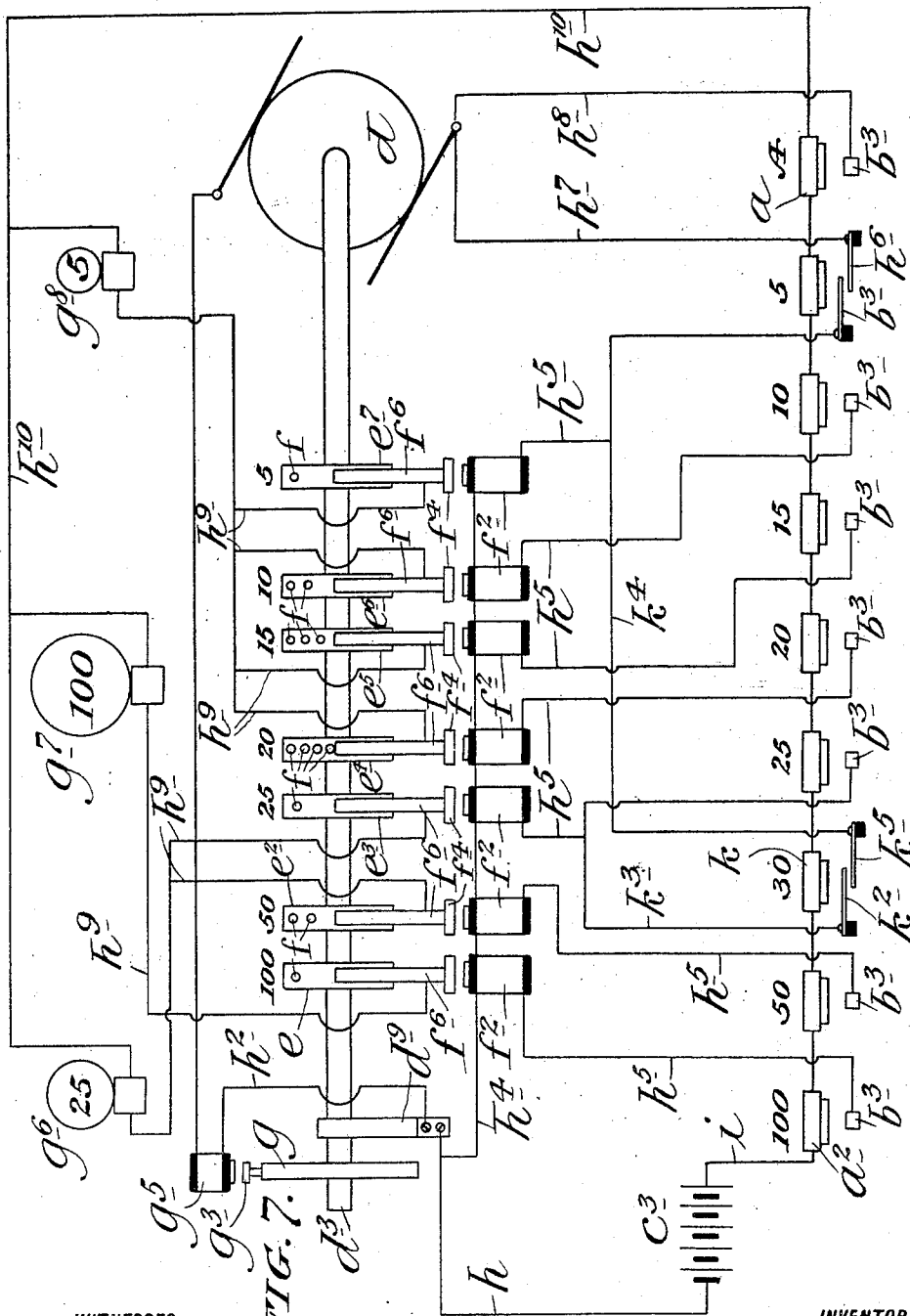
INVENTOR,
Thomas J. Sullivan,
BY Edgar Tate & Co.
ATTORNEYS.

T. J. SULLIVAN.
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Patented Feb. 11, 1913.

4 SHEETS—SHEET 4.



WITNESSES
C. E. Murphy
M. C. Drury

INVENTOR,
Thomas J. Sullivan,
BY Edgar Tate & Co.
ATTORNEYS.

UNITED STATES PATENT OFFICE.

THOMAS J. SULLIVAN, OF NEW YORK, N. Y.

ELECTRICAL ANNOUNCING ATTACHMENT FOR CASH-REGISTERS.

1,053,116.

Specification of Letters Patent.

Patented Feb. 11, 1913.

Application filed November 7, 1907. Serial No. 401,048.

To all whom it may concern:

Be it known that I, THOMAS J. SULLIVAN, a citizen of the United States, and residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Electrical Announcing Attachments for Cash-Registers, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

The object of this invention is to provide an electrically operated attachment for cash registers which will audibly announce by means of bells or similar devices the amount represented by a depressed key, or the amount shown on the face of the cash register at each operation thereof, and with these and other objects in view the invention consists in a device of the class specified constructed as hereinafter described and claimed.

The invention is fully disclosed in the following specification of which the accompanying drawings form a part, in which the separate parts of my attachment are designated by suitable reference characters in each of the views, and in which:—

Figure 1 is a front view of a box or case containing part of the operative mechanism of my improved attachment for cash register machines, part of the construction being shown in section, and said view showing also diagrammatically a part of the circuits employed and two of the keys of a cash register machine. Fig. 2 a plan view of one bank of the keys of a cash register machine and showing a metallic contact plate employed in connection therewith and which, in practice, is secured in the casing of the cash register machine behind the front wall of the casing parallel with the bank of keys. Fig. 3 a diagrammatic view of a plurality of circuit making and breaking disks used in connection with a supplemental motor shaft shown in Fig. 1. Fig. 4 is a vertical section of the supplemental motor shaft taken on the line 4-4, of Fig. 1 and showing one of the circuit making and breaking disks mounted thereon together with an electro-magnet and armature arm used in connection with said disk, part of the disk being shown in section. Fig. 5 a sectional end view taken on the dotted line 5, 5, of Fig. 1; Fig. 6 a complete diagrammatic view showing the application of my attachment or apparatus

to one bank of the keys of a cash register machine, and Fig. 7 a view similar to Fig. 6 but showing a modification.

Various forms of indicating devices have been employed in cash registers, but the value of the usual visual indication is limited inasmuch as it is viewable only from certain directions. Constructional limitations clearly prevent the employment of indicators of very large size, and with the small indicators practicable to use, they are not readable from a very great distance.

This invention aims to utilize the sense of hearing as well as the sense of sight by the provision of bells or other sounding devices designed audibly to announce amounts or other characteristics of transactions registered, each sounding device having assigned to it a single permanent value. With a device of this type the sound or announcement of the sounding device may be heard at a considerable distance and the customer or other person may, therefore, determine the amount which has been registered, though far away from the machine. In this construction only a few sounding devices are employed, and to enable so few devices to indicate definitely any one of a number of amounts, bells are arranged to ring in succession under certain conditions and to ring a plurality of times. The control of the bells is furnished by the machine keys of the cash register or like machine, and in the present embodiment, a motor driven mechanism serves to finally close contacts which control the bells. The motor circuit is closed by an initial key, though the five cent key is also shown as closing this circuit.

In the drawing forming part of this specification I have shown in Fig. 2 one bank of the keys of a cash register machine, this bank of keys beginning at the bottom with an initial key A, above which are placed, in the order named, keys representing five cents, ten cents, fifteen cents, twenty cents, twenty-five cents, fifty cents, and one dollar, and for the purpose of this description the initial key A and the dollar key are designated by the reference characters a and a^2 , and these two keys are also shown in Fig. 1, while the entire bank of keys is indicated diagrammatically in Fig. 6 and also in Fig. 7, and each of these keys is provided with a shank a^3 having a laterally directed contact pin a^4 .

Most cash register machines as now con-

constructed are provided with separate banks of keys provided with shanks which pass through the front wall of the casing of the machine and are operated by a push thereon, and the keys shown in the accompanying drawing are similarly constructed and similarly operated, but only one bank of keys is shown.

In connection with each bank of keys I employ a metal strip *b*, which is secured within the front wall of the casing of the machine adjacent to the shanks *a*³ of the keys, and these metal strips *b* are preferably provided with screw holes *b*² by which they may be secured to the front wall of the machine. The strips *b* are provided at intervals which correspond with the position of the keys with spring metal contact pieces *b*³ which range transversely of said metal strips, and which are insulated therefrom as shown at *b*⁴, and the free ends of which are in the direction of the shanks of the keys the contact pins *a*⁴, on the shanks of the keys are adapted to engage with these contact pieces *b*³. I also provide, as shown in Fig. 1, a casing *c*, in which the operative parts of my attachment are placed, and this casing may be supported adjacent to, or in connection with, above, or at either side of the cash register machine. In the bottom of the casing *c* in the form of construction shown are placed a plurality of battery cells *c*², *c*³ and *c*⁴, two of said cells *c*² and *c*⁴ being reserve cells, as shown in the accompanying drawing. The battery cells *c*², *c*³ and *c*⁴ are placed in separate compartments beneath a horizontal false bottom or partition plate *c*⁵ in the casing *c*, and above said false bottom or partition, and in one end of the casing *c* is placed an electric motor *d*, having a shaft *d*². In line with the shaft *d*² of the motor is placed a supplemental driving shaft *d*³ between which and the motor is a suitable support *d*⁴ in which is mounted a coupling shaft *d*⁵ connected with the supplemental shaft *d*³ by any suitable slip or friction coupling *d*⁶, the coupling shaft *d*⁵ is geared to the motor shaft *d*² by any suitable reduction gear *d*⁷ placed in a suitable housing *d*⁸ secured to the support *d*⁴, and the supplemental shaft *d*³ is supported at the end opposite the motor by a frame piece *d*⁹ secured to the casing *c* in any desired manner.

Mounted on the supplemental or driving shaft *d*³ and secured thereto are a plurality of contact, or circuit making and breaking disks *e*, which equal in number the cash keys of the cash register machine, and in practice, a series of these contact disks is employed in connection with each bank of keys. In the accompanying drawing there are seven cash keys in the bank of keys shown in Fig. 2, and there are therefore shown seven of the contact disks on the shaft *d*³. These disks, for the purpose of

this description are designated from left to right by the reference characters *e*, *e*², *e*³, *e*⁴, *e*⁵, *e*⁶ and *e*⁷. The contact disk *e* is shown separately in Fig. 4, and is provided on the face thereof with a contact knob or pin *f*. Mounted adjacent to each of the contact disks *e* and in the same vertical plane therewith is an electro-magnet *f*² provided with an arm *f*³ to which is pivoted an armature arm *f*⁴ weighted at one end as shown at *f*⁵, and provided at its opposite end with an upwardly directed extension *f*⁶ adapted to make connection with the contact pin or knob *f*. All the contact disks *e* are shown diagrammatically in Fig. 3. The disk *e*² is provided with two of the knobs or pins *f*, the disk *e*³ with one, the disk *e*⁴ with four, the disk *e*⁵ with three, the disk *e*⁶ with two, and the disk *e*⁷ with one, all of said contact pins or knobs and the said pins or knobs on the disks *e* forming contact points in connection with which the parts *f*⁶ of the corresponding arms *f*⁴ operate. The contact disk *e* operates in connection with the one dollar key *a*², the contact disk *e*² with the fifty cent key, the contact disk *e*³ with the twenty-five cent key, the contact disk *e*⁴ with the twenty cent key, the contact disk *e*⁵ with the fifteen cent key, the contact disk *e*⁶ with the ten cent key, and the contact disk *e*⁷ with the five cent key. It will be seen that the contact pins or knobs *f* on the separate disks are arranged at different radial points, this being necessary in the operation of the machine to prevent interference as hereinafter described, and in practice each of the disks *e* is preferably locked to the supplemental shaft *d*³ by a set screw *e*⁸.

The driving shaft *d*³ is provided, at the end opposite the motor with a locking disk *g*, (Figs. 1 and 5) having in its face a notch or recess *g*². Pivoted to the casing *c* is an armature arm *g*³ having a nose *g*⁴ adapted to enter said notch or recess, and supported over the end of the armature arm *g*³ is an electro-magnet *g*⁵. Mounted on and connected with the casing *c* are a plurality of bells *g*⁶, *g*⁷ and *g*⁸ provided within said casing with boxes *g*⁹ in which the vibratory mechanism is placed. The bell *g*⁶ is a twenty-five cent bell, the bell *g*⁷ a dollar bell and the bell *g*⁸ a five cent bell.

Referring to Fig. 6, it will be seen that connected to the positive pole of the battery *c*³ is a lead wire *h* which is also connected to the supporting plate *d*⁹ of the driving shaft *d*³. Said support is connected with the release magnet *g*⁵ by a wire *h*² and the magnet *g*⁵ is connected with the positive brush of the motor by a wire *h*³. The contact making magnets *f*² are connected in series by a wire *h*⁴, which is connected to the lead wire *h*, and each of said magnets is also connected to its corresponding contact piece *b*³ by a wire *h*⁵. In the construc-

tion shown, the five cent key is provided with a double contact, one part of which is placed below the contact piece b^3 as shown at h^6 . The contact h^6 is connected with the negative brush of the motor, and the contact piece b^3 of the initial key A is also connected with the negative brush of the motor by a wire h^8 . The contact part f^6 of each of the armature arms f^4 of the magnets f^2 is connected to a wire h^9 . The wire h^9 of the armature arm f^4 which contacts with the dollar disk e connects with the dollar bell g^7 ; and corresponding wires h^9 of the armature arms f^4 which contact with the fifty cent and twenty-five cent disks, e^2 and e^3 , connect with the twenty-five cent bell g^6 , while the wires h^9 of the armature arms f^4 which contact with the twenty cent, fifteen cent, ten and five cent contact disks connect with the five cent bell g^8 . The bells g^6 , g^7 and g^8 are connected to a common return wire h^{10} which leads to the negative pole of the battery, and it will be understood, that the strip or plate b is represented in Fig. 6, by that part of the return wire h^{10} with which the contact parts b are connected and constitutes a common return for all the keys. The magnets f^2 are provided with vertically extending stops m and the arms f^3 of said magnets are provided with stops n and these stops limit the movement of the armature arms f^4 in both directions. The stops n hold the armature arms in proper position while the stops m prevent the extensions f^6 of the arms f^4 from coming in contact with the disk e .

The operation of the apparatus, as shown in Figs. 1 to 6 inclusive, will be readily understood from the foregoing description when taken in connection with the accompanying drawing and the following statement thereof: Suppose that it is desired to register one dollar. The dollar key a^2 shown in Fig. 1 is depressed; this throws the contact pin a^4 of said key into engagement with the strip b^3 and the latter is therefore depressed into contact with the strip or plate b . A circuit is thus closed (Fig. 6) from the battery through the wire h , the wire h^4 , the dollar magnet f^2 , the corresponding wire h^5 , the corresponding contact piece b^3 , contact piece or strip b and return wire h^{10} back to the battery. This operation energizes the dollar magnet f^2 and the corresponding armature arm f^4 is thrown into the position shown in dotted lines in Fig. 4. The initial key A is then forced in and a circuit is completed through the wire h , the wire h^2 , the magnet g^5 , the wire h^3 , the motor d and the wire h^8 back to the return wire h^{10} , or in other words to the strip or plate b . The closing of this latter circuit energizes the motor d , and the magnet g^5 . Said release magnet raises the armature arm g^8 thereby

releasing the locking disk g and the motor starts. The contact or circuit making and breaking disks e turn with the shaft d^3 and as said shaft turns, the dollar disk e , in the above described operation, makes contact with the corresponding armature arm f^4 , and a circuit is closed from the battery through the wire h , support d^3 , shaft d^3 , contact disk e , the said armature arm f^4 , wire h^9 , the dollar bell g^7 and through said bell to the return wire h^{10} and thus back to the battery. This insures the ringing of said dollar bell once because there is only one contact pin f on the dollar disk e . As a further illustration of the operation, suppose it be desired to register thirty cents. In this case the twenty-five cent key is depressed and the circuit is closed through the wire h , the wire h^4 , the magnet f^2 which corresponds with the twenty-five cent disk e^3 , the wire h^5 of said magnet, the contact piece b^3 of the twenty-five cent key and back through the strip b and return wire h^{10} to the battery. When the twenty-five cent key is depressed in this manner it stays down and the five cent key is then depressed thus closing a circuit from the battery through the wire h , the wire h^4 , the five cent magnet f^2 , the corresponding wire h^5 , the corresponding contact piece b^3 , the strip or plate b to return wire h^{10} and thus back to the battery. The five cent key is then further depressed and a circuit is closed from the battery through the wire h , the wire h^2 , the magnet g^5 , the wire h^3 , the motor d and wire h^8 , the contact piece h^6 , strip b and return wire h^{10} to the battery. The twenty-five cent key and the five cent key, in the first contact made by the five cent key as above described actuate the corresponding magnets f^2 , thus throwing the parts f^6 of the corresponding armature arms f^4 into position to be engaged by the contact pins or knobs f on the twenty-five and five cent disks e^3 and e^7 . The extreme depression of the five cent key previously mentioned energizes the release magnet g^5 and releases the locking disk g and starts the motor. As the shaft d^3 rotates, the pin or knob f on the twenty-five cent disk strikes the part f^6 of the corresponding armature arm f^4 and a circuit is closed through the wire h , support d^3 , the shaft d^3 , the twenty-five cent disk, the corresponding armature f^4 , the wire h^9 to the twenty-five cent bell g^6 , which is rung once and the circuit is also completed through the wire h^{10} back to the battery. The five cent bell g^8 is operated exactly in the same manner by the five cent disk e^7 , but the arrangement of the contact pins or knobs f on said disks, as shown in Fig. 3, is such, that the twenty-five cent bell is operated first. In the construction shown there are only three bells employed, a dollar bell, a twenty-five cent, and a five cent bell; and

this arrangement of bells makes necessary the arrangement of contact pins or knobs f on the contact or circuit making and breaking disks e as herein shown and described, the fifty cent disk being provided with two, the twenty cent disk with four, the fifteen cent disk with three and the ten cent disk with two of said pins or knobs. There is no fifty cent bell, and when it is desired to register and announce fifty cents, the fifty cent key is depressed and the initial key A; in this operation the fifty cent disk e^2 is turned and the twenty-five cent bell is sounded twice. There is also no twenty cent bell and when it is desired to register and announce twenty cents, the twenty cent key is depressed, and this is followed by the depression of the initial key A and the twenty cent disk is turned and the five cent bell circuit is broken and made four times by the four pins or knobs f on the twenty cent disk e^4 . There is also no ten cent bell, but the operation of registering and announcing this amount will be the same as when fifty cents or twenty cents is registered and announced. When there is an odd amount to be registered the initial key A is not used, but the five cent key wired as shown in Fig. 6, takes the place of it. In practice the dollar bell is given a deep pitch, the twenty-five cent bell a medium pitch, while the five cent bell is given a sharp or high pitch, and in practice, the deeper pitched bell employed is always rung first. All this enables any one within hearing quickly to calculate amounts indicated by said bells.

From the foregoing description it will be seen that the amount keys are arranged in groups and each group controls the operation of an announcing device such as a bell corresponding thereto. The first group consists of the keys from five to twenty inclusive and controls the bell g^5 , the said group comprises the twenty five and fifty cent keys and controls the bell g^6 , while the third group as shown consists of only the one dollar key which controls the ringing of the bell g^7 , it being understood that other keys may be employed to enlarge the capacity if desired. It will be understood, that any one will quickly become accustomed to the sound produced by these bells, and will recognize in an instant the character or amount represented by each particular bell.

In Fig. 7 of the drawing I have shown a modified form of wiring my improved apparatus, in which the keys are connected in series by a wire z , and said keys in themselves constitute a part of the return circuit and in this form of construction the metal strip or plate b is not used, the wire z and the keys themselves taking the place of said strip or plate. In this construction or form of wiring I have shown a combination key

k , that is a key operating two of the magnets f^2 at one depression. I have shown for illustration a thirty cent key. To announce this amount I must sound the twenty-five cent bell and then the five cent bell. When the key k is depressed it first contacts with the strip h^2 , this closes a circuit from the battery through the wire h , wire h^4 , magnet f^2 of the twenty-five cent disk, wire h^3 , wire h^5 , key k and return wire i ; a further depression of the key k closes a circuit through the wire h , wire h^4 , magnet f^2 of the five cent disk, wire h^5 , wire h^4 , contact strip h^5 , key k and return wire i . The initial key is now depressed which closes a circuit through the magnet g^5 and motor d , as previously explained. The remainder of the wiring in this form is the same as shown in Fig. 6.

Although I have described the parts f on the contact or circuit breaking and making disks e as knobs or projections it will be understood that any suitable contact making devices connected with the said disks e and armature arms f^4 that would operate in the same manner might be substituted therefor.

In the accompanying drawing I have shown in the casing c the circuit making and breaking wheels e , the magnets f and their connected parts which operate in connection with only one bank of keys of the cash register machine, but it will be understood that in practice, these parts are duplicated for each bank of keys.

From the foregoing description it will be seen that my improvement constitutes an attachment for cash register machines by means of which amounts registered may be audibly announced or signaled in such manner as to be understood by anyone in the vicinity of the machine, or within the sound of the bells g^5 , g^7 and g^8 , and it will also be apparent that my improvement is not limited to the exact arrangement of bells shown and described, nor to the exact details of any features of the construction as shown and described, and various changes therein, and modifications thereof may be made, within the scope of the appended claims, without departing from the spirit of my invention or sacrificing its advantages.

It will be understood that the shaft d^3 moves through one revolution only each time that the magnet g^5 and motor d are energized, and this occurs each time that the initial key or the five cent key is operated, or a complete operation as herein described performed, and it will also be understood that the motor shaft d^2 on which a balance wheel p is placed may continue to turn under its own momentum, after the supplemental shaft d^3 is locked by the nose g^4 of the armature g^3 engaging the notch or recess g^2 in the disk g ; this operation being ren-

dered possible by means of the slip coupling d^c . As long as the initial key is depressed, the motor circuit remains complete and the motor therefore continues to turn. However, when the initial key is released, the motor circuit is then broken and the magnet g^5 will then allow its armature to drop, whereby the nose g^4 will drop into the notch g^2 when the latter reaches the position of the nose. The nose will meanwhile ride on the wheel g .

Although I have described the cash register keys as being of the form provided with shanks movable through the front wall of the cash register casing, it will be understood that other styles of keys may be employed, and in such cases the details of the apparatus herein described which operate in connection with the keys will be correspondingly changed. It will also be apparent that though I have described an electro-motor for operating the shaft d^3 , a spring or other motor may be employed, in which event certain details of the apparatus will be changed in order to comply with the changes in the style of the motor employed.

What is claimed is—

1. An attachment for cash registers comprising a driving motor and a shaft connected for operation thereby, contact disks mounted on said shaft and having contact points, magnets adjacent said disks, magnet armature having contact elements, keys and connections therefrom for energizing said magnets, and announcing mechanism controlled by said disk and said armature contacts.

2. An attachment for cash registers comprising a motor and a shaft connected for operation thereby, devices for locking said shaft against rotation, disks mounted on said shaft and having contact elements, magnets mounted adjacent said disks and having contact bearing armatures, keys and a common plate connected to energize said magnets, and announcing or signal bells controlled by said disk and said armature contact elements.

3. An attachment for cash registers, comprising an electric motor, a shaft connected for operation thereby, a lock disk on said shaft, a lock controlling magnet having an armature positioned to engage and lock said lock disk, circuit controlling disks mounted on said shaft and having contact elements, magnets mounted adjacent said disks and having armatures bearing contact elements, announcing or signal bells controlled by said disk and said armature contact elements, and a circuit including said motor and said lock controlling magnet.

4. In an attachment for cash register machines, an electric motor, a rotary shaft connected therewith, means for locking said shaft against rotation, a plurality of cir-

cuit making and breaking disks connected with said shaft and provided with electrodes, magnets supported adjacent to said disks, armature arms operating in connection with said magnets, and provided with electrodes adapted to operate in connection with the electrodes on said disks, means for limiting the movement of said armature arms in either direction and announcing mechanism controlled by said disk and armature electrodes.

5. In a machine of the class described, the combination with the keys of an accounting machine, of sounding devices of differing pitch designed audibly to announce amounts registered, each device having assigned to it a single permanent value, and connections controlled by said keys constructed to sound said devices singly or in succession depending on the keys depressed.

6. In a machine of the class described, the combination with the keys of an accounting machine, of sounding devices of differing pitch designed audibly to announce amounts registered, each device having assigned to it a single permanent value, and connections controlled by said keys constructed to sound said devices numbers of times depending on the particular keys employed.

7. In a machine of the class described, the combination with the keys of an accounting machine, of sounding devices of differing pitch designed audibly to announce amounts registered, each having assigned to it a single permanent value, and connections controlled by said keys constructed to sound said devices singly or in succession a number of times depending on the keys employed.

8. An attachment for cash register machines provided with the usual keys, comprising contact devices adapted to be placed inside of the case and adjacent to each bank of keys, a battery or other source of electricity, an electric motor, and bells of different pitch designed to announce the amounts registered, all of said parts being in open electric circuits adapted to be closed by operating the keys of the machine.

9. An attachment for cash register machines provided with the usual keys, comprising contact devices adapted to be placed inside of the case and adjacent to each bank of keys, a battery or other source of electricity, an electric motor, and bells of different pitch designed to announce the amounts registered, all of said parts being in open electric circuits adapted to be closed by operating the keys of the machine, and the announcement of certain amounts involving two or more figures requiring the use of a corresponding number of keys and a corresponding number of bells.

10. An attachment for cash register machines provided with the usual bank of

keys, comprising contact devices adapted to be placed inside of the case and adjacent to each bank of keys, bells of different pitch designed to announce the amounts registered, and in electrical connection with said
5 contact devices, an electric motor and connections controlled by said motor for sounding said bells, and contact devices, all of said parts and devices being in open electric
10 circuits adapted to be closed by operating the keys of the cash register machine, and the announcement of certain amounts involving two or more figures requiring the use of a corresponding number of keys and
15 a corresponding number of bells.

11. In a machine of the class described, the combination with the keys of an accounting machine, of electrically operated sounding devices of differing pitch designed
20 audibly to announce amounts registered, each having assigned to it a single permanent value, contact strips adjacent said keys and forced into contact thereby, and connections from said contact strips to said
25 sounding devices, the connections being constructed to sound said devices singly or in succession a number of times depending on the keys employed.

12. In a machine of the class described, the combination with the keys of an accounting machine, of electrically operated sounding devices of differing pitch designed
30 audibly to announce amounts registered, each having assigned to it a single permanent value, contact strips adjacent said keys and forced into contact thereby, and circuits including said strips and sounding devices
35 and closed by said keys, said circuits being constructed to sound said devices singly or in succession numbers of times depending on the keys depressed.

13. In a machine of the class described, the combination with the keys of an accounting machine, of electrically operated
45 sounding devices of differing pitch designed audibly to announce amounts registered, each having assigned to it a single permanent value, and normally open circuits including said sounding device and controlled
50 by said keys, the construction of said circuits being such as to sound said devices singly or in succession depending on the keys employed.

14. An attachment for cash register machines provided with keys and with a plurality of bells of different pitch adapted to announce different amounts, said bells being
55 also adapted to announce different units of different amounts, means whereby said bells are operated by the keys of the cash register, and means whereby said bells may be operated to announce different amounts
60 and different units of different amounts at one depression of a key.

65 15. In a machine of the class described,

the combination with the keys of an accounting machine, of a plurality of electrically operated sounding devices of differing pitch each having assigned to it a single permanent value, circuits including said sounding
70 devices and means controlled by said keys for closing said circuits numbers of times depending on the particular keys employed.

16. In a machine of the class described, the combination with the keys of an accounting machine, of electrically operated sounding
75 devices of differing pitch each having assigned to it a single permanent value, circuits including said sounding devices, and means controlled by said keys for automatically closing said circuits singly or in succession depending on the particular keys
80 employed.

17. In a machine of the class described, the combination with the keys of an accounting machine, of electrically operated sounding
85 devices of differing pitch, each having assigned to it a single permanent value, circuits including said sounding devices, and means controlled by said keys for automatically closing said circuits singly or in succession numbers of times depending on the
90 particular keys employed.

18. In a machine of the class described, the combination with the keys of an accounting machine, of a plurality of electric bells
95 of differing pitch, each having assigned to it a single permanent value, circuits including said bells, contact makers for said circuits, one for each key, said contact makers having different numbers of contact points depending on the value of the keys, and
100 means controlled by the keys for completing said bell circuits.

19. In a machine of the class described, the combination with the keys of an accounting machine, of electrically operated sounding
105 devices of differing pitch, each having assigned to it a single permanent value, circuits including said sounding devices, contact makers for said circuits, one for each key and having differing numbers of contact points, and contact devices thrown into
110 operative relation with said contact makers by said keys.

20. In a machine of the class described, the combination with the keys of an accounting machine, of electrically operated sounding
115 devices of differing pitch, each having assigned to it a single permanent value, circuits including said sounding devices, contact makers for said circuits, one for each key, and having differently positioned contact points, and contact devices thrown successively into operative relation with said
120 contact makers by said keys.

21. In a machine of the class described, the combination with the keys of an accounting machine, of electrically operated sounding
125 devices, of differing pitch, each having

assigned to it a single permanent value, circuits including said sounding devices, rigidly connected contact makers for said circuits, one for each key and having differing numbers of differently positioned contact points, and contact devices thrown into operative relation with said contact makers by said keys.

22. In a machine of the class described, the combination with the keys of an accounting machine, of electrically operated sounding devices of differing pitch, each having assigned to it a single permanent value, and designed audibly to announce registered amounts, rigidly connected contact makers for said circuits, one for each key and having differing numbers of differently positioned contact points, contact devices thrown into operative relation with said contact makers by said keys, and motor means for driving said connected contact makers.

23. In an attachment for accounting machines, the combination with a plurality of bells of different pitch designed to announce units of different value, of a plurality of depressible keys controlling the bells to announce the value of the keys depressed, and means operated by one of said keys controlling the actuation of a plurality of said bells to announce the value of the key.

24. In an attachment for accounting machines, the combination with a plurality of sounding devices of different pitch designed to announce units of different value, of a plurality of groups of keys, each group of keys controlling the operation of the corresponding sounding device, and an independent key controlling the operation of a plurality of said sounding devices to announce the value of the key.

25. In an attachment for accounting machines, the combination with a plurality of sounding devices of different pitch designed to announce units of different value, a plurality of groups of keys, each group controlling the operation of a corresponding sounding device singly or a number of times depending on the keys employed, and an independent key controlling the operation of a plurality of said sounding devices to announce the value of the key.

26. In an attachment for accounting machines, the combination with a plurality of sounding devices of different pitch designed to announce units of different value, a plurality of groups of keys, each group controlling the operation of the corresponding sounding device singly or a number of times depending on the keys employed, and an independent key controlling the successive operation of a plurality of said sounding devices to announce the value of the key.

27. In an attachment for accounting machines, the combination with a plurality of

sounding devices of different pitch designed to announce units of different value, of groups of depressible keys corresponding in number to the sounding devices, a shaft, means actuated thereby for sounding the devices corresponding to the groups in which keys are depressed, and a single key controlling the operation by the shaft of a plurality of the sounding devices.

28. In an attachment for accounting machines, the combination with a plurality of sounding devices of different pitch designed to announce units of different value, of groups of depressible keys corresponding in number to the sounding devices, a shaft, means actuated thereby for sounding the devices singly or a number of times corresponding to the groups in which keys are depressed, and a single key controlling the operation by the shaft of a plurality of the sounding devices.

29. In an attachment for accounting machines, the combination with a plurality of sounding devices of different pitch designed to announce units of different value, of groups of depressible keys corresponding in number to the sounding devices, a shaft, a motor for driving said shaft, a key for starting said motor, means actuated by the rotation of the shaft for sounding the devices corresponding to the groups in which keys are depressed, and a single key controlling the operation by the shaft of a plurality of sounding devices.

30. In an attachment for accounting machines, the combination with a plurality of devices for announcing the amount of a transaction, of groups of depressible keys corresponding in number to the announcing devices, a shaft, a motor key controlling the rotation of said shaft, means actuated by the shaft for operating the announcing devices corresponding to the groups in which keys are depressed, and a single key controlling the operation by the shaft of a plurality of sounding devices.

31. In an attachment for accounting machines, the combination with a plurality of devices for announcing the amount of a transaction, of groups of depressible keys corresponding in number to the announcing devices, contacts closed by the operation of the keys, a shaft, additional contacts closed by the rotation of the shaft for operating the announcing devices corresponding to the groups in which keys are depressed, and a single key controlling the operation by the shaft of contacts to operate a plurality of announcing devices.

32. In an attachment for accounting machines, the combination with a plurality of devices for announcing the amount of a transaction, of groups of depressible keys corresponding in number to the announcing devices, contacts closed by the operation of

the keys, a shaft, a motor for driving said shaft, a key controlling the operation of the motor, additional contacts closed by the rotation of the shaft for operating the announcing devices corresponding to the groups in which keys are depressed, and a single key controlling the operation by the shaft of contacts to operate a plurality of announcing devices.

33. In an attachment for accounting machines, the combination with a plurality of devices for announcing the amount of a transaction, of groups of depressible keys corresponding in number to the announcing devices, a shaft, a motor key controlling the rotation of said shaft, and means actuated by the shaft for operating the announcing devices corresponding to the groups in which keys are depressed.

34. In an attachment for accounting machines, the combination with a plurality of devices for announcing the amount of a transaction, of groups of depressible keys corresponding in number to the announcing devices, a shaft, a motor key controlling the rotation of said shaft, and means controlled by the depressed keys and the shaft for operating the announcing devices corresponding to the groups in which keys are depressed.

35. In an attachment for accounting machines, the combination with a plurality of devices for announcing the amount of a transaction, of groups of depressible keys corresponding in number to the announcing devices, a shaft, and contacts closed by the depressed keys and the rotation of the shaft for operating the announcing devices corresponding to the groups in which keys are depressed.

36. In an attachment for accounting machines, the combination with a plurality of devices for announcing the amount of a transaction, of groups of depressible keys corresponding in number to the announcing devices, a shaft, means normally locking said shaft, a key controlling the unlocking and rotation of the shaft, and contacts closed by the keys of the various groups and the rotation of the shaft for operating the announcing devices corresponding to the groups in which keys are depressed.

37. In an attachment for accounting machines, the combination with a plurality of sounding devices of different pitch designed to announce units of different value, of groups of depressible keys corresponding in number to the sounding devices, a shaft, and means successively actuated thereby for sounding the devices singly or a number of times depending on the keys depressed.

38. In an attachment for accounting machines, the combination with a plurality of sounding devices of different pitch designed to announce units of different value, of

groups of depressible keys corresponding in number to the sounding devices, a shaft, a motor for rotating said shaft, a key controlling the motor, and contacts successively actuated by the shaft for sounding the devices singly or a number of times depending on the keys depressed.

39. In an attachment for accounting machines, the combination with a device for announcing various amounts, of a plurality of keys for determining the amounts to be announced by said device, electrically operated means for actuating the announcing device, and means operated by one of said keys for also controlling the operation of the actuating means.

40. In an attachment for accounting machines, the combination with a device for announcing various amounts, of a plurality of keys for determining the amounts to be announced by said device, a shaft for actuating the announcing device, a motor for driving said shaft, and means operated by one of said keys for also controlling the operation of the shaft by the motor.

41. In an attachment for accounting machines, the combination with a device for announcing various amounts, of a plurality of keys for determining the amounts to be announced by said device, a shaft for actuating the announcing device, means normally locking said shaft, a motor for driving the shaft, and means also controlled by one of said keys for unlocking the shaft and starting the motor.

42. In an attachment for accounting machines, the combination with a device for announcing various amounts, of a plurality of keys for determining the amounts to be announced by said device, a shaft for actuating the announcing device, means normally locking said shaft, a motor for driving the shaft, and an electric circuit also controlled by one of said keys for unlocking the shaft and starting the motor.

43. In an attachment for accounting machines, the combination with a device for announcing various amounts, of a plurality of keys, contacts closed by said keys for determining the amounts to be announced by said device, a shaft, additional contacts closed by the rotation of said shaft for actuating the announcing device, a motor for driving said shaft, electric circuits embracing said contacts and motor, and an additional contact operated by one of said keys for closing the motor circuit.

44. In an attachment for accounting machines, the combination with a device for announcing various amounts, of a plurality of keys, contacts closed by said keys for determining the amounts to be announced by said device, a shaft, additional contacts closed by the rotation of said shaft for actuating the announcing device, a motor for driving

said shaft, magnetically controlled means normally locking said shaft, electric circuits embracing the contacts, motor and magnetically controlled locking means, and an additional contact operated by one of said keys for closing a circuit common to the motor and locking means.

45. In a device of the class described, the combination with a key of an accounting machine, of sounding devices having different pitches, and electrically operated connections for said sounding devices controlled by said key whereby said sounding devices may be operated in succession.

46. In a machine of the class described, the combination with a key of an accounting machine, of electrically operated sounding devices of different pitches, circuits including said sounding devices, and means con-

trolled by said key for automatically closing said circuits in succession.

47. In a device of the class described, the combination with a key of an accounting machine, of sounding devices having different pitches, and operating connections for said devices controlled by said key whereby one of said devices may be operated a plurality of times or a number of said devices may be operated in succession.

In testimony that I claim the foregoing as my invention I have signed my name in presence of the subscribing witnesses this 6th day of November 1907.

THOMAS J. SULLIVAN

Witnesses:

C. E. MULREANY,
M. E. DOODY.

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