

M. R. LONGACRE.  
CASH REGISTERING AND INDICATING MACHINE.

No. 449,328.

Patented Mar. 31, 1891.

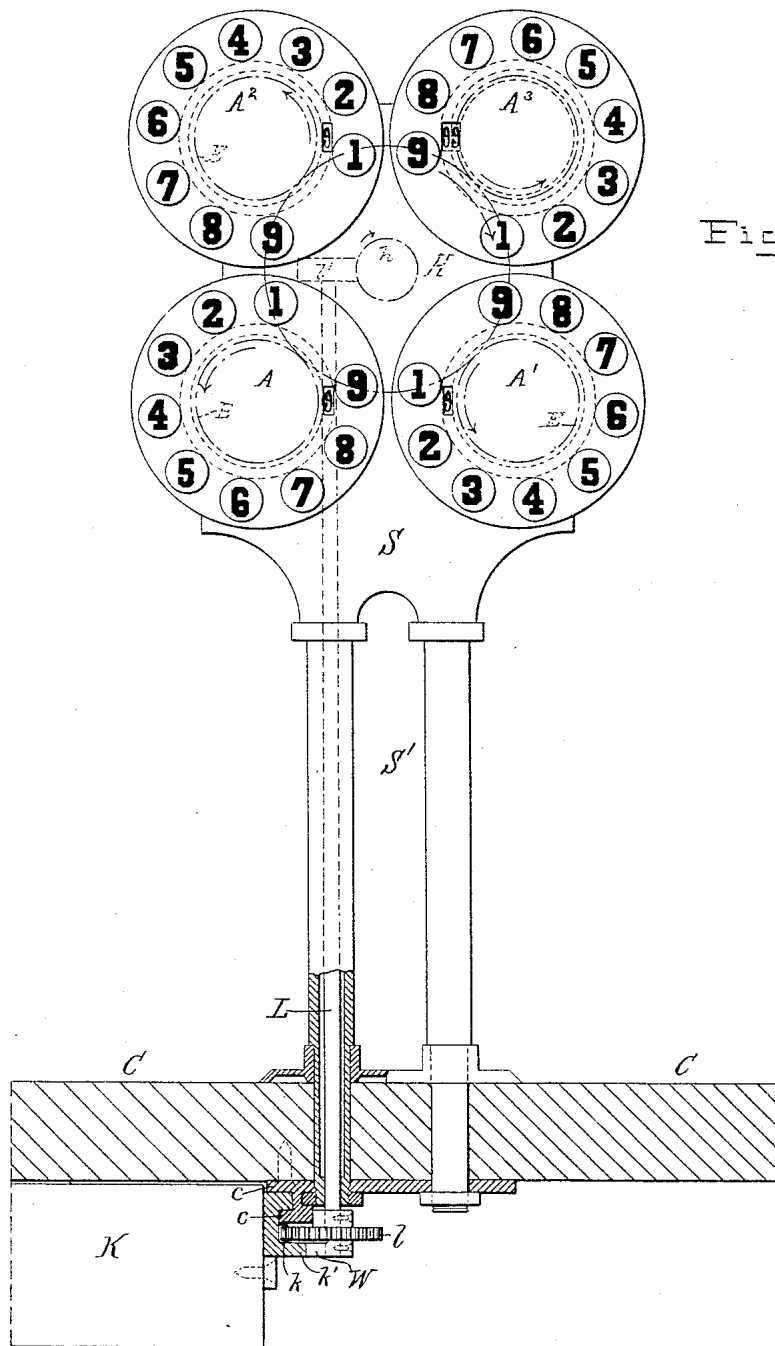


Fig. 1.

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*George Baumann*  
*John Revell*

INVENTOR

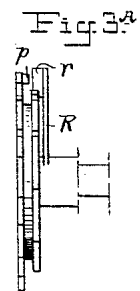
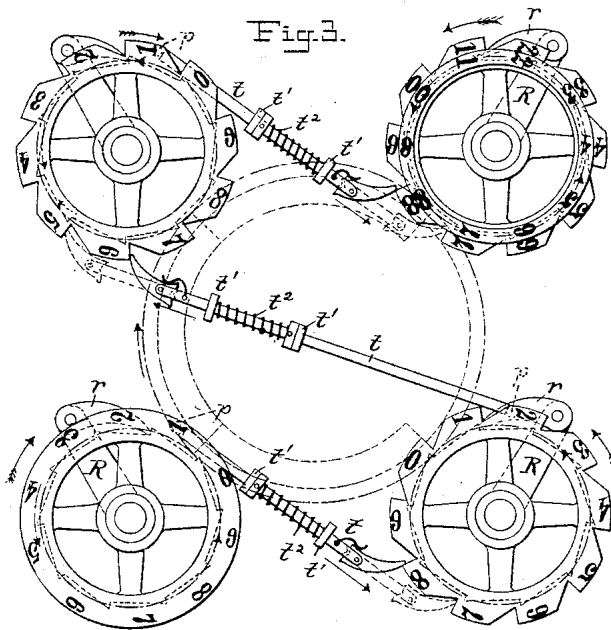
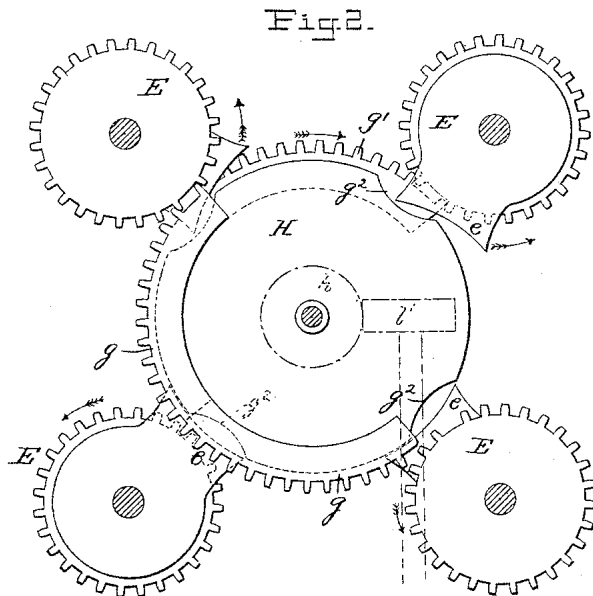
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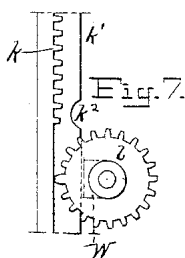
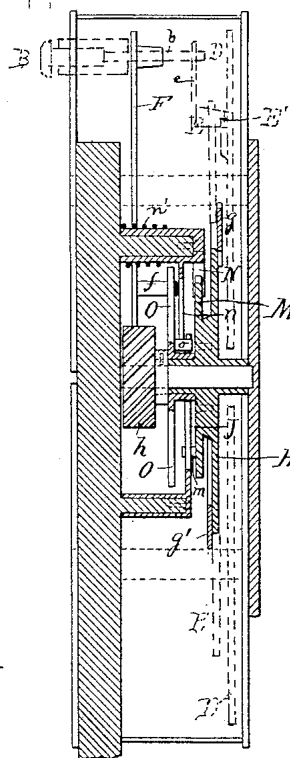
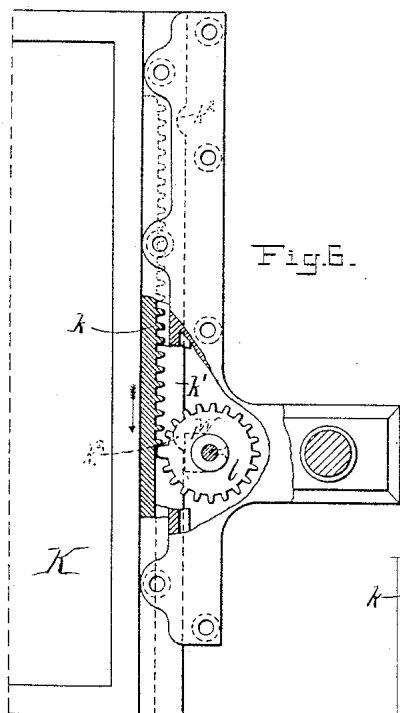
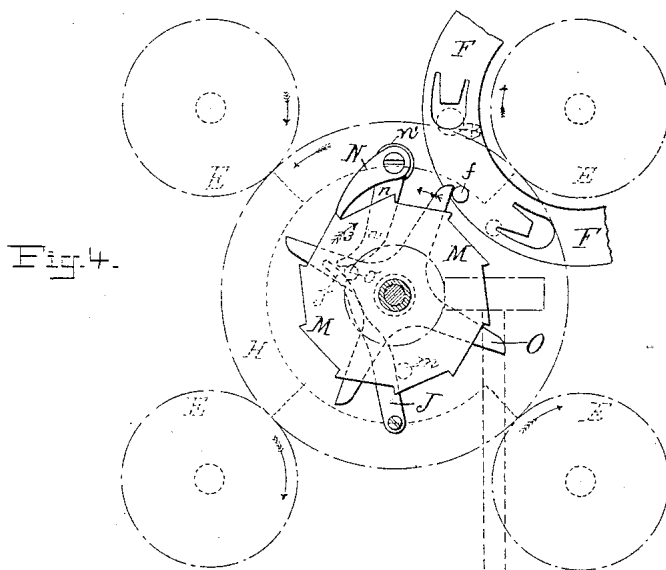
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# UNITED STATES PATENT OFFICE.

MATTHIAS R. LONGACRE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO  
THE LONGACRE COMPANY, LIMITED, OF SAME PLACE.

## CASH REGISTERING AND INDICATING MACHINE.

SPECIFICATION forming part of Letters Patent No. 449,328, dated March 31, 1891.

Application filed May 15, 1890. Serial No. 351,894. (No model.)

*To all whom it may concern:*

Be it known that I, MATTHIAS R. LONGACRE, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented  
5 Improvements in Cash Registering and Indicating Machines, of which the following is a specification.

My invention consists of certain improvements in the construction of cash indicating  
10 and registering machines, which improvements have been more especially designed for application to the apparatus for which I have obtained Letters Patent of the United States,  
15 dated June 10, 1890, No. 429,927. My present improvements—some or all of them—may, however, be applied to other constructions of indicating and registering machines than as illustrated in my said application.

One of the chief objects of my present invention is to so construct the registering  
20 mechanism and devices for operating the same that the several registering-wheels to which the indicated figures are transferred will be operated at different or independent  
25 intervals of time, or, in other words, successively, so that in carrying over from one such registering-wheel to the next higher no such error can arise as might happen in a machine in which two or more registering-wheels are  
30 operated at the same time to transfer the figures from their respective indicators.

A further object of my invention is to so construct the apparatus that the drawer or  
35 other handled device by which the indicating and registering mechanism is operated cannot be returned to its closed or normal position until it has first been carried to the full extent of its forward movement for the making of an indication.

40 My invention also comprises certain other improvements in the construction of the apparatus, which will be more fully referred to hereinafter.

In the accompanying drawings, Figure 1 is  
45 an elevation, with the counter and part of the stand in section, of the complete indicating and registering apparatus, looking at it from the salesman's side of the counter. Fig. 2 is  
50 a view of the means for operating the indicating and registering mechanism. Fig. 3 is a view illustrating the registering-wheels and

means for carrying from one registering-wheel to the next higher. Fig. 3<sup>a</sup> is an edge  
view of one of the registering-wheels. Fig. 4  
is a view of the device for preventing the re- 55  
turn movement of the drawer or other operating device until its forward movement has been completed. Fig. 5 is a corresponding sectional view. Fig. 6 is a plan view of the  
60 drawer and slide, partly broken away, and with the counter removed. Fig. 7 is a detached view of part of the drawer, rack, and pinion gearing into it.

As I have before said, my present improvements are designed more especially for appli- 65  
cation to the indicating and registering machine forming the subject of my above-mentioned patent, and I have in the accompanying drawings shown my present invention as  
70 so applied.

The characteristic feature of the machine  
of my aforesaid patent is that it is composed  
of two or more indicating mechanisms, each  
having a movable indicator, preferably in the  
form of a disk, and an operating-wheel there- 75  
for, and a set of numbered controlling-keys to determine the extent of movement of the indicator and arranged in a circle and passing  
80 through the frame transversely at right angles to the rotating indicating-disk and with their numbered heads on one side of the frame, while in the other side of the frame is an opening for exhibiting to the customer the numbers  
85 on the indicating-disk. In my said patent these indicating mechanisms are shown combined with a cash-drawer or other handled device, which imparts a positive motion to each indicator, first in one direction to an extent determined by the operated key to make  
90 an indication and then in the reverse direction to return the indicator to its normal position. As a matter of preference the registering-wheels combined with each of these indicating systems are mounted on the same spindle  
95 and are operated positively by the same cash-drawer or other handled device, either as the indicators are moved forward to make an indication or as they are returned to their normal positions. These several indicating and  
100 registering mechanisms, central driving-wheel, and other parts are mounted in a suitable fixed frame supported by a post on the

counter of the store or other suitable base, and when the drawer is used as the operating means the drawer is geared to an upright shaft which transmits motion to a driving-wheel common to the several indicating and registering systems. By the term "indicator" I do not wish to be understood as meaning merely the numbered disks, but to include the moving parts carrying or carried by the disks.

My present improvements are shown in the accompanying drawings as applied to an indicating and registering machine embodying these principles or features. I have shown the machine as provided with four of these indicating and registering mechanisms on what I have termed the "units system," two such mechanisms for the dollars and two for the cents, so that the machine can indicate any amount up to ninety-nine dollars and ninety-nine cents and can make totalizing registries up to any amount, depending in the present case only upon the number of registering-wheels for the tens column of dollars. In this instance I have shown in Fig. 1 the registry for the tens columns of dollars as provided with two registering-wheels, so that total registries can be made up to nine hundred and ninety-nine dollars and ninety-nine cents. It should be understood, however, that I do not limit myself to a machine having any special number of indicating and corresponding registering wheels, as two, three, or more may be used, according to the character of the machine required, and my improvements may be applied to an "interval" machine as well as to a units machine.

Referring to Fig. 1, C represents the counter, table, or other suitable base upon which the mechanism is supported, and K indicates the cash-drawer, which is mounted to slide in suitable guides *c* below the counter or other suitable base, and which I prefer to use as the means for imparting motion to both indicating and registering wheels, as described in my aforesaid patent. The post *S'*, supporting the indicating and registering mechanism, in this case is shown as two-legged simply as a matter of structural convenience. Through one of these legs, which is made tubular, passes the shaft *L*, by which motion is transmitted from the drawer *K* to the moving members of the indicating and registering mechanisms. For this purpose a pinion *l* on the lower end of the upright shaft *L* gears into a rack *k* on one side of the drawer.

The stand or frame *S*, which is mounted upon the post *S'*, carries the four frames *A* *A'* *A<sup>2</sup>* *A<sup>3</sup>*, each containing its own indicating and registering mechanism, as described in my above-cited patent. Each indicating system is provided with keys numbered from 1 to 9, and the indicating and registering wheels are numbered correspondingly. The indicating system *A* is for the units column of cents, the system *A'* is for the tens column of cents, the system *A<sup>2</sup>* is for the units column

of dollars, and the system *A<sup>3</sup>* for the tens column of dollars. It has not been thought necessary to illustrate in these drawings the details of the keys and devices for throwing the indicators out of gear with their operating-wheels by the operation of the keys to determine the extent of movement of the indicators, as these devices may be substantially the same as shown in my above-mentioned patent, No. 429,927. For the sake of illustration, however, I have indicated in Fig. 5 one such key *B* as in a position to act on the tail *e* of the pawl *E'* on an operating-wheel *E* to throw the latter out of engagement with its indicator *D*. The position of one such key is also indicated by dotted lines in connection with the tripping-disk *F* in Fig. 4.

Each indicating system, with its corresponding registering wheel or wheels, has its own operating-wheel *E*, and all of them are driven by the common driving-wheel *H*, as described in my above patent; but according to my present invention this driving-wheel, instead of being an ordinary gear-wheel, is specially constructed for the purpose of operating the registering-wheels, as I have said, in independent intervals of time. As in my former machine, this wheel *H*, acting on the several operating-wheels *E*, primarily moves the indicators of the several systems, and thus operates the registering-wheels. Two of the indicators *D* are shown in dotted lines in Fig. 5. Motion is imparted to the central driving-wheel *H* through the medium of a worm *l'* upon the upper end of the upright shaft *L*, gearing into a worm *h*, secured to the shaft carrying the driving-wheel *H*. In the present instance, as illustrated in Fig. 5, this shaft of the driving-wheel *H* is hollow and mounted to turn on a central spindle in the frame *S*. The construction of this driving-wheel *H* will be understood on reference to Figs. 2 and 5, from which it will be seen that instead of being a complete gear-wheel it has two segmental racks or gears *g* *g'* lying in different planes and each of about the length of a semicircle. They are so set with reference to each other that a diametrical line connecting the opposite ends of one segment will lie at right angles to a diametrical line connecting the opposite ends of the other segment, as will be seen on reference to Fig. 2. One of these segmental racks *g* is in this instance adapted to gear into the operating-wheels *E* of diametrically-opposite systems, while the other segmental rack *g'* is adapted to gear into the operating-wheels *E* of the other alternate and diametrically-opposite indicating systems. It will be seen, however, that as each segment is about the length of a semicircle or slightly less it can gear into only one of its two operating-wheels at a time, and the driving-wheel *H*, with its segmental racks, and the operating-wheels *E* of the several systems are so proportioned that the length of each rack is about equal to the circumference of each operating-wheel

E. I prefer to combine with this construction safety devices, whereby the racks on the driving-wheel shall always gear properly into their operating-wheels. For this purpose I may make use of something in the nature of a "Geneva stop," consisting of the curved segment *e*, carried by each wheel E and coinciding with the smooth part of the circumference of the driving-wheel H. This smooth circumference in this instance lies between the planes of the segmental racks *g g'*. At proper points in this smooth circumference are cut notches *g<sup>2</sup>*, which permit the projecting parts of the segments *e* to enter therein and allow the corresponding operating-wheel E to turn as soon as it comes into gear with its corresponding rack. As soon as the operating-wheel has completed its revolution and becomes disengaged from the rack of the driving-wheel the curved segment *e* will find itself coinciding with the smooth periphery of the driving-wheel, and the operating-wheel will then be locked in the proper position to re-engage with the rack on the return movement of the driving-wheel.

The registering-wheels of the four systems are illustrated in Fig. 3, and each of these registering-wheels is provided with ratchet-teeth corresponding in number with the figures on the wheels, as indicated by the dotted lines, Fig. 3. Into these ratchet-teeth engage pawls *r* on the arms or wheels R, driven by the operating-wheels E of these several indicating systems, and these pawls may be so set that the registering-wheel or first wheel of a set corresponding to any one indicator may be operated on either the forward or return movement of the operating-wheel E. In Fig. 3 I have shown pawls of the two systems on the left-hand side as set to move the registering-wheels when the operating-wheels are moved in one direction, while the pawls of the systems on the right-hand side are arranged to operate the registering-wheels when their operating-wheels E are moved in the other or reverse direction. The driving-wheel H being common to all the operating-wheels E, it is evident that the registering mechanism is operated by the driving-wheel H on both its forward and return movements. Since the racks *g g'* of the driving-wheel move the operating-wheels E, two in the first half, say, of the forward revolution and the remaining two during the second half of the forward revolution, it will be seen that by this arrangement of the pawls *r* one registering-wheel only will be moved during the first half of the forward revolution, another will be moved during the next half of the forward revolution of the driving-wheel, while a third registering-wheel will be moved during the first half of the return movement of the driving-wheel and the fourth during the second half of the return movement of the driving-wheel. By this means no two registering-wheels to which indicated figures are transferred are moved during the same interval of time, and conse-

quently the registering movement of one wheel may be carried over to the next higher and through all the series without any possible danger of mistake, such as might occur if any two of such registering-wheels should be operated at the same time.

I may use any convenient means for carrying over from one registering-wheel to the next, and in Fig. 3 I have shown devices which may be conveniently employed for that purpose. These consist of a pawl, rod, or bar *t*, mounted to slide in guides *t'* in the frame and acted on by springs *t<sup>2</sup>* to normally move the bar in a direction opposite to that indicated by its arrow in Fig. 3. The end of each bar carries a spring-pawl to engage with suitable teeth or depressions in the registering-wheel. A pin or projection *p* on each registering-wheel, except the last, (indicated by dotted lines in Fig. 3 and in full lines in Fig. 3<sup>a</sup>), acts on the rear end of the adjacent pawl-bar *t* as the registering-wheel completes its revolution, so that each complete revolution of, say, the lowest registering-wheel will cause a one-step movement to be imparted to the next higher wheel.

It is evident from the foregoing that without departing from my invention the carrying device between the tens of cents and the units of dollars can be dispensed with and additional adders placed on the tens-of-cents system, as shown in the tens of dollars.

In order to prevent the parts from being returned to zero for a new operation before the drawer and consequently the driving-wheel H have been moved to their full forward limits, I provide safety devices, such as illustrated in Figs. 4 and 5. These consist of a ratchet-wheel M, fixed to or formed in one with the driving-wheel H or geared to the driving-wheel H, so as to move with it and with this ratchet-wheel is combined a pawl N, pivoted to the frame or casing. This pawl has a tail-piece *n*, adapted to be acted on by a pin or projection *o* on a wheel O, which has as many arms as there are indicating and registering systems. In the present instance, as shown, this wheel O has four arms, and it is free to turn to a limited extent upon the shaft of the driving-wheel H. These four arms project outward at such points that they will lie in the paths of pins or projections *f* upon the tripping-disks F of the several indicating systems, one tripping-disk F only being indicated on the drawings. Normally this wheel O is in such a position that its pin or projection *o*, acting on the tail *n* of the pawl N, will, against the action of a suitable spring *n'*, keep the pawl N normally out of engagement with the ratchet M; but when one of the tripping-disks is moved by the operation of any key of its system the pin *f* on the tripping-disk F will strike the arm of the wheel O and move it in the direction of its arrow, Fig. 4, into the position indicated in that figure. The pawl N will thus, under the action of the spring, fall into engagement with the ratchet-wheel

M, and then the driving-wheel H, while it can move forward in the direction of its arrow, cannot be moved backward until the pawl N is thrown out of engagement with the ratchet-wheel again. This latter is effected by a pin *m* on the ratchet-wheel acting (on the completion of the forward movement of the driving-wheel) upon the left-hand side of the lever or arm J, (in the figure,) so that the latter, acting upon the pin *o* of the pawl-controlling wheel O, will push it from the position shown in Fig. 4 in the direction of the arrow 3. Through the action of the pin *o* upon the tail of the pawl N the latter will be freed from the ratchet-wheel again, and the driving-wheel and indicating-wheels can then be returned to their normal or zero positions.

As the extent of movement of the cash-drawer K is in most cases more than sufficient to give the necessary extent of rotary movement to the upright shaft L, I may combine with the rack and pinion a safety device somewhat similar in character and operation to the safety device used on the driving-wheel H, as shown in Fig. 2. I prefer to have this lost motion between the drawer and pinion either wholly or partly at the end of the closing movement of the drawer, as shown in Fig. 7, so that even should the salesman by accident not push the drawer entirely in for making his change he will nevertheless have pushed it so far in as to return the indicating mechanism to zero. The safety device consists of a flat-sided washer W, which runs upon a rib or flange *k'* on the drawer-rack as the pinion *l* becomes disengaged from the rack at either end. In this rib or flange are formed notches *k<sup>2</sup>* adjacent to the ends of the rack *k*, so that as the pinion enters into engagement with the rack either on the forward or backward movement of the drawer the pinion will then be free to turn until it has completed its revolution while in engagement with the rack. Then the flat side of the washer W, as the pinion disengages from the rack, will come into coincidence with the flange *k'*, so as to hold the pinion in proper position for re-engagement of the rack on the return movement of the drawer.

I claim as my invention—

1. In an indicating and registering machine, the combination of two or more indicators and two or more corresponding registering-wheels with a driving-gear device common to the said registering-wheels, and having a movement first in one direction and then in the reverse direction, and adapted to operate the registering-wheels on both of said movements, as and for the purpose set forth, and means to actuate the said driving-gear device.

2. In an indicating and registering machine, the combination of two or more indicators and two or more corresponding wheels with a driving gear-wheel common to the said registering-wheels, and having a movement

first in one direction and then in the reverse direction, and adapted to operate the registering-wheels on both of the said movements, as and for the purpose set forth, and a cash-drawer or other handled device to impart a positive motion to the said driving-wheel.

3. Two or more indicating mechanisms having movable indicators and a series of keys determining their extent of movement and registering-wheels to correspond with the indicators, in combination with a driving gear-wheel common to the several indicating and registering mechanisms and a cash-drawer or other handled device positively moving the said driving-wheel first in one direction to make a part of the registries and then in the reverse direction to make the remainder of the registries.

4. The combination of two or more indicating mechanisms with movable indicators, and sets of controlling-keys determining their extent of movement and having corresponding registering-wheels, and a driving-gear device common to the said indicators and registering-wheels, and moving first in one direction and then in the reverse direction, and adapted to make indications on one of these movements and to operate the corresponding registering-wheels part in one and part in the other of these movements, as and for the purpose set forth, and means to operate the driving-gear device.

5. The combination of two or more registering-wheels, each having an operating-wheel, with a common driving-wheel having one or more racks to gear with the said several operating-wheels, each rack being adapted to rotate two of said operating-wheels in succession.

6. The combination of two or more indicating-wheels, each having a corresponding registering-wheel and an operating-wheel, with a common driving-wheel to gear with the said several operating-wheels and rotate them first in one direction to make indications and part of the corresponding registries and then in the reverse direction to return the indicating parts to their normal positions and make the remaining registries.

7. The combination of two or more indicating-wheels, each having a corresponding registering-wheel and an operating-wheel therefor, with a common driving-wheel to gear with the several operating-wheels, and having a movement first in one direction and then in the other, and operating some of the registering-wheels on one of the movements and some on the other, and devices for transmitting motion from one such registering-wheel to another.

8. The combination of two or more indicating-wheels, each having a corresponding registering-wheel and an operating-wheel, with a common driving-wheel having one or more racks to turn some of the operating-wheels at different times, and a safety device,

substantially as described, to lock one or more of the operating-wheels while the driving-wheels rotate the others.

9. The combination of two or more indicating mechanisms and a common driving gear-wheel therefor with a ratchet-wheel moving with the said driving-wheel, a pawl adapted to engage with the said ratchet-wheel and means to disengage it at the end of the movement of the driving-wheel in making an indication, and a cash-drawer or other handled device to move the driving-wheel.

10. The combination of two or more movable indicators, operating-wheels therefor, and a series of controlling-keys determining the extent of movement of the indicators, and a common driving-wheel for the said operating-wheels with a ratchet-wheel moving with the said driving-wheel, and a pawl adapted to be engaged with the said ratchet-wheel on the operation of a key and to be disengaged at the end of the movement of the driving-wheel in making an indication.

11. The combination of two or more indicating and registering mechanisms, each having a series of controlling-keys determining the extent of movement of its indicator, and a common driving-wheel for the indicators and corresponding registering-wheels with a ratchet-wheel moving with the said driving-wheel and a pawl adapted to be engaged with the ratchet-wheel on the operation of a key and to be disengaged at the end of the movement of the driving-wheel in making an indication.

12. The combination of two or more indicating mechanisms, each having a series of controlling-keys determining the extent of movement of its indicator, an operating-wheel therefor, and a driving-wheel common to the several operating-wheels with a ratchet-wheel moving with the said driving-wheel,

a pawl pivoted to the frame, a wheel controlling the engagement of the pawl with the said ratchet-wheel operated by the keys of any system, and with an arm to disengage the pawl when the driving-wheel completes its movement in making an indication, all substantially as described.

13. Two or more indicating-wheels and corresponding registering-wheels and an operating-wheel to move the said indicators and their corresponding registry-wheels, in combination with a common driving-wheel adapted to gear with the several operating-wheels to move the said indicators and make corresponding registries in part when the indicators are moved to make their indications and in part when the various parts are returned to their normal positions, and a drawer or other handled device to operate the said driving-wheel.

14. The combination of indicating and registering mechanisms with a driving-shaft therefor having a pinion and a cash-drawer having a rack to gear into the said pinion, but out of gear therewith when the drawer is entirely closed.

15. The combination of indicating and registering mechanisms with a driving-shaft therefor having a pinion, and a cash-drawer having a rack, and a safety device, substantially as described, to lock the shaft as its pinion passes out of gear with the rack, all substantially as described.

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

MATTHIAS R. LONGACRE.

Witnesses:

WILLIAM D. CONNER,  
HARRY SMITH.