

(No Model.)

5 Sheets—Sheet 1.

J. MASON & S. SHOUP.
ADDING AND PRINTING MACHINE.

No. 468,250.

Patented Feb. 2, 1892.

FIG. 1.

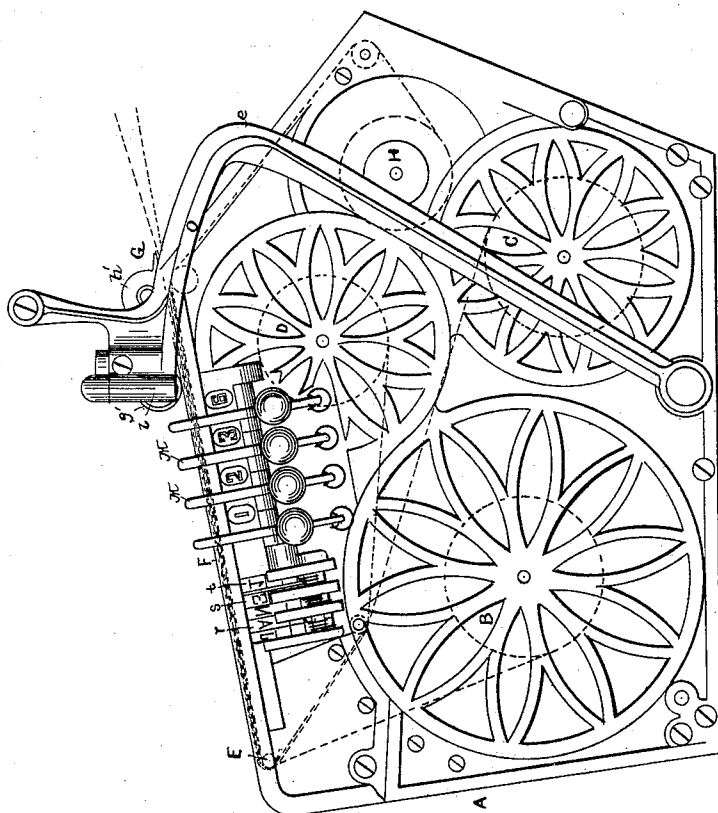
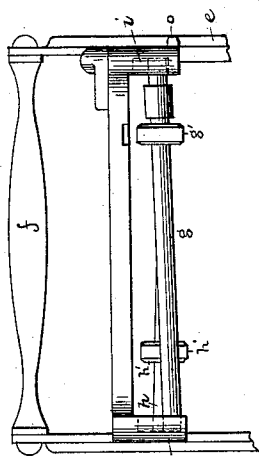


FIG. 2.



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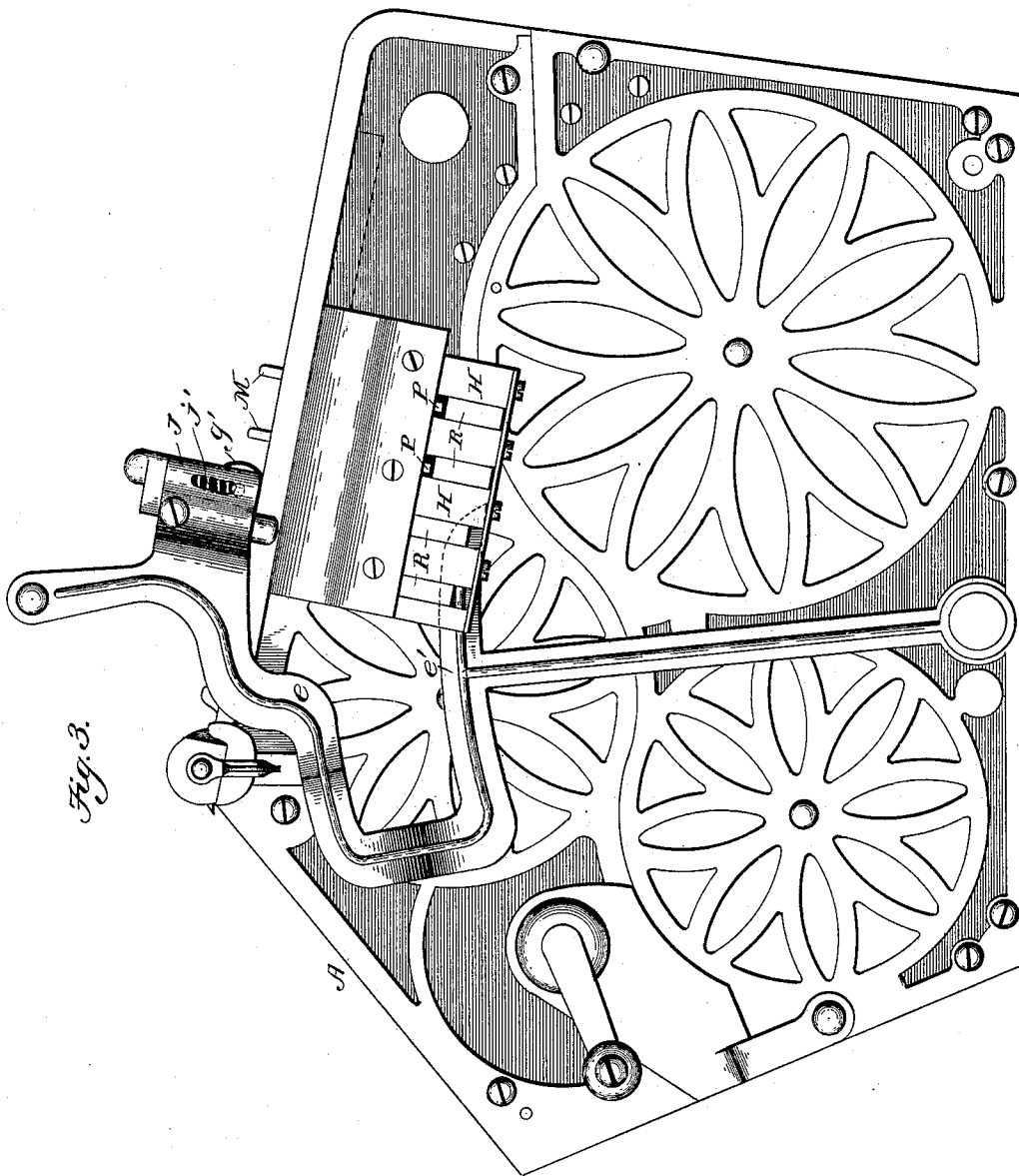
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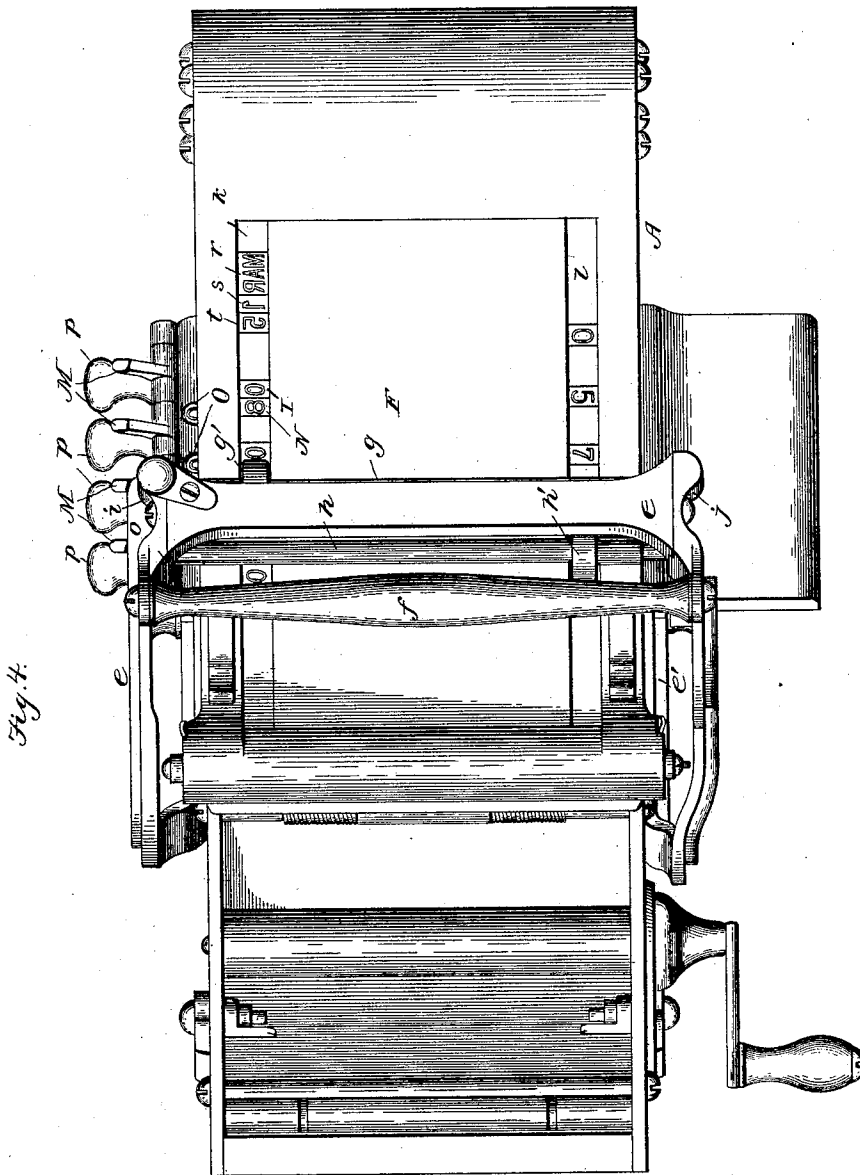
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5 Sheets—Sheet 4.

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Fig. 5.

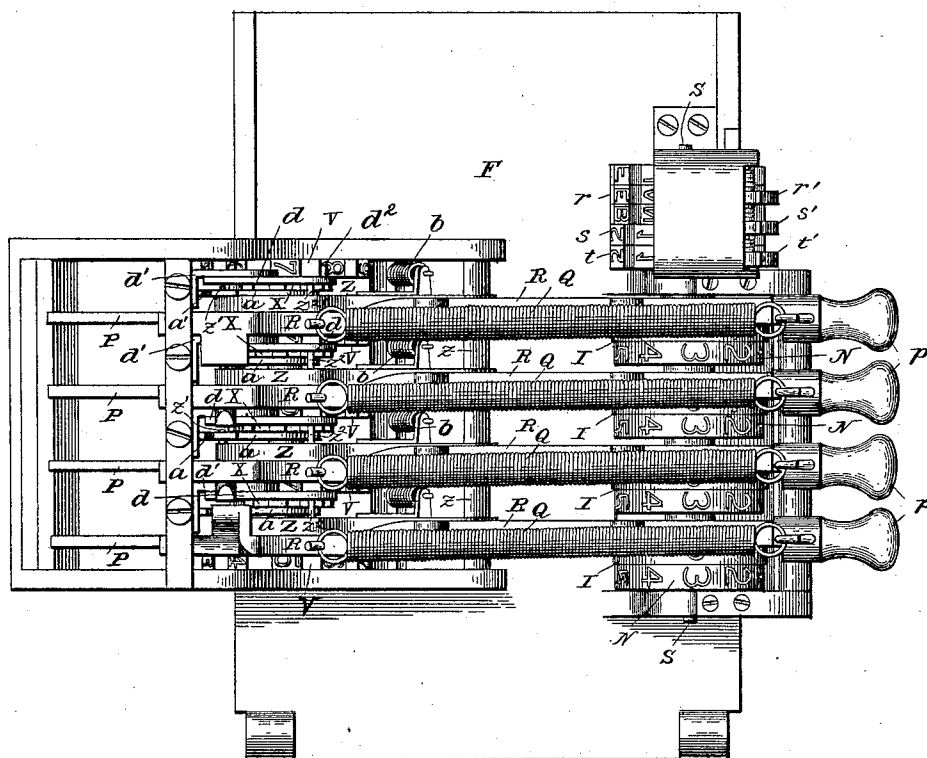
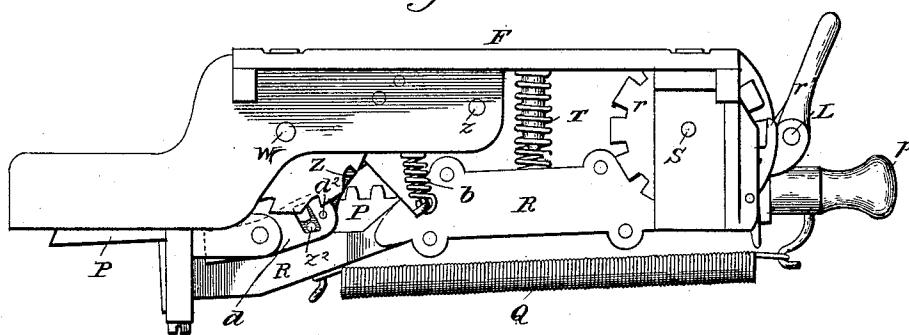


Fig. 6.



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Fig. 7.

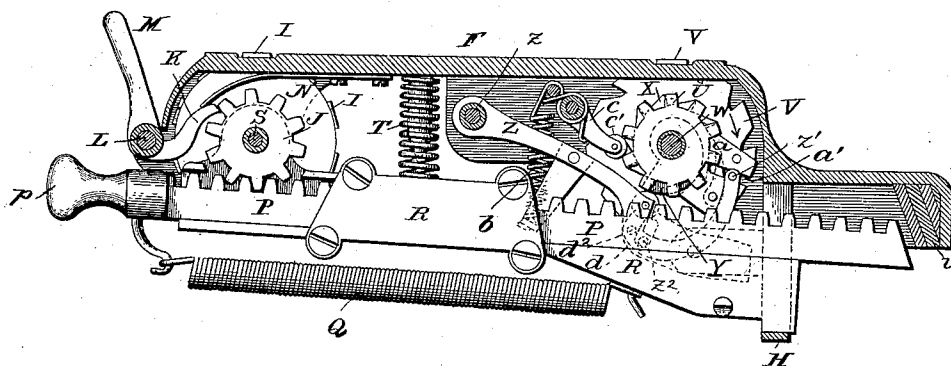


Fig. 9.

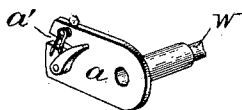
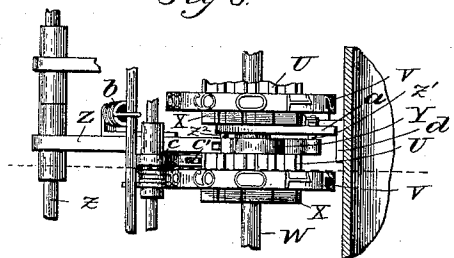


Fig. 8.



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UNITED STATES PATENT OFFICE.

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ADDING AND PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 468,250, dated February 2, 1892.

Application filed October 21, 1889. Serial No. 327,861. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH MASON, residing at New York, in the county of New York and State of New York, and SAMUEL SHOUP, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, citizens of the United States, have invented certain new and useful Improvements in Adding and Printing Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in adding and printing apparatus; and it consists, specially, of certain means and appliances, whereby it is adapted to be used in connection with an autographic register. There are, however, certain novel features in our adding and printing mechanism which can be applied to instruments of the same class, whether detached or in combination with other devices.

The details of our apparatus will be fully set forth in the specification which follows, and they are illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of an autographic register having our adding and printing apparatus applied thereto. Fig. 2 is a front elevation of a portion of the same, showing the devices by means of which we trip the adding mechanism. Fig. 3 is an elevation of the machine on the side opposite to that shown in Fig. 1. Fig. 4 is a top view of the machine. Fig. 5 is an inverted plan of the plate F and the attached adding mechanism. Fig. 6 is a side view of one part of the adding mechanism. Fig. 7 is a section of the same, looking in the opposite direction. Fig. 8 is a plan of the numbering-wheels, the plate F being broken away; and Fig. 9 is a detail.

A is the casing of an autographic registering apparatus similar to that patented to J. C. Shoup on the 9th day of October, 1883, and numbered 286,560. Within the casing are suitable feed-rolls B, C, and D, on which are wound strips of paper, which are led to the forward part of the machine, where they pass over a roller E, as shown at the left in Fig. 1.

From the roller E the strips are carried over a bed or plate F, with interposed carbon-paper to admit of taking copies. At the outer end of the plate F or a little beyond a knife-edge G is located, so that the projecting ends of the paper strips can be torn off evenly.

In the use of the register it is customary for a clerk or salesman to write upon the outer sheet over the bed-plate a record of a transaction. Copies of the same record are made on the inner strips, and the whole is fed forward by pulling on the upper end of the strips or otherwise, as the case may be. It will be observed that the strip on the roller D does not remain outside the casing under the knife-edge, but re-enters the same and is wound upon a roller H. Such are the principal parts of the autographic register already referred to as it is ordinarily used. Our improvements are concerned with adapting this register to supply a record in type of any given transaction, at least so far as the figures are concerned. We have provided devices whereby a salesman may set the apparatus to indicate the proper sum, after which he may print the sum, together with sum total resulting from all the sales which he may have made within a given period of time. The first sum represents of course the amount covered by a particular transaction. The apparatus by means of which we accomplish these results is for the most part supported under the plate F and attached thereto. In the plate F at the right, as shown in Fig. 4, is an opening through which a type-wheel I projects. The wheel extends just far enough above the surface of the plate to be in position for having an impression taken from it. The types are arranged on successive cogs or teeth on the wheel. Rigidly connected with the wheel I is a pinion J, Fig. 7, against which a spring-pressed dog K rests. The dog is formed on a sleeve surrounding the shaft L, and on the same sleeve is formed a handle M, the sleeve, dog, and handle being accordingly in a single piece. By pulling on the handle the dog can be lifted from the pinion J and so leave it free to be rotated in either direction.

Now the type on the wheel I represents numbers, one of which may be taken as the

units-wheel, another as the tens, and so on. In Figs. 5 and 7 it will be seen that there is a smaller wheel N on the same shaft with the wheel I, also provided with number-types arranged two numbers apart from those on the larger wheel, as shown in Fig. 4. The numbers on the wheel N are arranged to come in line with an opening O in an angular portion of the plate F, (also shown in Fig. 4,) the arrangement being such that when any given numeral on the wheel N is in view at the opening O the corresponding number will be presented at the opening at the top of the plate on the other wheel.

Below the pinion J is a rack-bar P, which engages therewith and is provided with a handle *p*, projecting outside the casing A. By pulling on this handle the rack can be withdrawn, and in so doing moves with it the pinion and adjusts the wheel I, so as to bring any required number into line for printing, the observation being taken through the opening O. The outward movement of the rack is resisted by a spring Q, which tends to hold it in its inward position. It is evident that if the rack has been pulled out it will be restored by the action of the spring Q as soon as the dog K is withdrawn, as already described. Now the rack P is arranged to move or reciprocate within a guide-plate R, and the latter is pivoted upon the shaft S, as shown in dotted lines, Fig. 7. The outer end of the guide-plate is pressed by a spring T away from the top plate F as far as possible. It is brought to rest against any suitable support, as H. The object of this is to keep the rack-bar out of engagement with pinion U on the shaft W during the withdrawal of the rack. On the return of the rack, however, after the release of pinion J, cam devices *e'* (shown in Fig. 3) are provided for making the rack engage also with the pinion U and give that pinion and the connected apparatus a partial rotation. The nature of the cam devices will be explained hereinafter. In one piece with the pinion U or rigidly connected therewith are a number-wheel V, a ratchet X, and a cam Y. (Shown in Fig. 8.) As the rack-bar engages the pinion on its way back it rotates all these connected parts and through the medium of the cam Y operates a lever Z on the shaft *z*. The shape of the cam and that of the lever Z is best shown in Fig. 7. The lever is provided with a pin *z'* in its outer end, which extends into a slot *a'* in an arm *a* on the shaft W. This arm has attached to it a spring-dog, which engages with the ratchet X on the same shaft. This latter ratchet forms part of a similar group to that already described, consisting of a ratchet, a number-wheel, a pinion, and a cam. The object of the construction just described is to provide for operating succeeding number-wheels of a higher order at every tenth operation of a wheel of the lower order. For example, when the units-wheel has been operated nine times the next operation will actuate the tens-

wheel through the medium of the mechanism described, and so on. The operation of these devices is as follows, it being assumed that each lever Z is drawn toward the top plate F by a spring *b*, and that there are four of these levers in the construction illustrated and five groups of number-wheel, ratchet, pinion, and cam similar to that shown in Fig. 8. The ratchet on the units-wheel may be dispensed with, and of course the number of groups may be increased or diminished, according to circumstances.

It has already been stated that the rack actuates the groups only on its return. Now every time it does actuate the pinion U it moves at the same time the cam Y, lifting it or rather forcing it along the surface of the lever Z until it reaches the point where the latter is cut away, as shown in Fig. 7, when the lever is drawn inward by the force of the spring *b* with a sudden movement. During the outward movement of the lever, due to the action of the cam, it acts to move the arm *a* in the direction of the arrow in Fig. 7. It accomplishes this by means of the pin *z'*, acting on the side of the slot *a'*. This movement of the arm *a* causes the withdrawal of the spring-dog connected with it from the notch in which it lies on the ratchet-wheel X, and by the time the lever has reached its extreme outward position the dog has been pressed into the next notch, so that when the lever makes its quick movement under the influence of the spring *b*, as above described, it pushes with it the arm *a*, the dog, and the ratchet, with its connected parts, a distance represented by the length of a single tooth on the ratchet. This action takes place at every tenth movement of the units-wheel and also at every tenth movement of the tens-wheel, and so on, the action of pushing forward the ratchet a single tooth taking place in every instance on the ratchet connected with the number-wheel of the next higher order. This is an operation which will be readily understood by those familiar with adding-machines.

To prevent slipping, each group of wheels, including the ratchet, number-wheel, pinion, and cam, is held in place by a spring-pressed arm *c*, which forces a roller *c'*, pivoted to it, into the space between two succeeding teeth on the pinion U.

In the lever Z is a second pin *z²*, which plays within a slot in a detent-arm *d*, which is pivoted to a bracket on the frame at *d'*, as shown in Figs. 5 and 6. The slot in the detent is a closed slot, and as the lever is moved outward, carrying the pin *z²*, it moves the detent with it and draws it back again when the lever itself is returned. Now the detent itself is provided with a pin *d²*, which catches into one of the notches on the wheel V and holds it. The slot in the detent gives play enough, so that the lever Z and the pin *z²* do not begin to move it until the lever has nearly reached the extremity of its outward move-

ment. Then it is withdrawn beyond the periphery of the number-wheel and is moved back when the lever falls inward into the next notch in the number-wheel to that which it first occupied. The object of this is to prevent the number-wheel from being thrown too far by the quick movement of the lever.

It now remains to describe the means by which the rack is made to engage with the pinion U on its return movement, and also the devices by which the printing is accomplished. A light frame *e* is provided with arms which extend down along the casing A and are pivoted near the bottom thereof, as shown. The frame has at the top a handle *f*, by means of which it can be drawn forward along the bed-plate F and immediately over the same. Just above the plate F are rods or spindles *g h*, the former of which is provided with a rubber roller *g'* near one end, while the latter is provided with a similar roller *h'* near its opposite end. These rods are extended at each end into suitable boxes *i* and *j* in frame *e*, and within the boxes are springs *j'*, which tend to keep the rods pressed down upon the plate F. The rollers *g'* and *h'* are arranged to travel in grooves *k* and *l* in the plate F, the paths of their movement being respectively along the peripheries of the wheels I I I I and V V V V V, or rather over those portions of their peripheries which extend above plate F. Thus one roller will print the numerals on one side of the plate which represents the individual numbers or the amount of a given transaction, while the other roller will print the numbers indicating the sum total.

It will be observed that the roller *g'* is in advance of the roller *h'*. This is necessary in order to allow time for the rack to return and operate the sum-total wheels before the impression from the latter is taken.

That side of the frame *e* which is next to the sum-total wheels is provided with a cam *e'*, which engages successively with the outer ends of the rack-bars and pushes them up into engagement with the co-operating pinions. It is necessary that the operation of these racks should be in regular succession, and that the release and return of the racks should take place in the same succession, so that the units-wheel may be first operated and then the tens-wheel, and so on; otherwise each group would be unable to act upon the succeeding group, as has been described above—that is to say, if the rack which operates the second group were already in engagement with the pinion on that group the carrying forward of the second number-wheel to make this necessary addition for every tenth movement of the first wheel would be impossible. Now the successive release of the racks is accomplished by a projection *o* on the frame coming into contact successively with the handles M M M M.

We have thus far omitted to describe a means which we have provided for indicating

the month and day on which a given transaction takes place. This consists, simply, of a group of wheels, (shown at *r s t*), one of which has upon it, in type, characters for indicating the month, and the other two are respectively units and tens wheels for indicating days of the month. Spring-detents *r'*, *s'*, and *t'* are provided for holding the wheels in place after they are set. These detents are removed by pressing with the hand on the bottom thereof when the wheels are moved to indicate the proper date. The indication is made at an opening in the plate F, and the characters forming the indication are in line with the numbers on the wheels I I I I.

At *v* we have shown, Fig. 7, a buffer of rawhide or other suitable material for taking up the shock when the racks are returned.

In case any one of the wheels H is turned too far it can be released and turned back to the proper position without disturbing the result, as nothing which is done to such a wheel before the cam comes into play on the sum-total wheels has any effect either on those wheels or on the remainder of the group of wheels marked H.

It is evident that by employing individual wheels and sum-total wheels, both of which leave a printed record on the locked-up strip as well as on the issue-strips, we provide means for the easy detection of fraud, and so furnish a check on the clerk or other person using the apparatus.

Having now described our invention, what we claim is—

1. The combination, with a series of number-wheels for indicating the amount of a given transaction and a second parallel series of number-wheels for indicating the sum total, of racks co-operating with the first series of number-wheels and means for causing the said racks to engage with the second series in their return movement only, as and for the purpose set forth.

2. The combination, with a series of number-wheels for indicating the amount of a given transaction and a second parallel series of number-wheels for indicating the sum total, of racks co-operating with the first series of number-wheels, springs for returning the said racks, and a frame provided with tripping devices for the said rack and also with cam devices which operate on the free ends of the racks and force them into engagement with the second series of number-wheels, as and for the purpose set forth.

3. The combination, with an autographic register, of an adding-machine consisting of the combination, with a series of number-wheels for indicating the amount of a given transaction and a second parallel series of number-wheels for indicating the sum total, of racks co-operating with the first series of number-wheels, springs for returning the said racks, a frame provided with tripping devices for the said racks, and also cam devices which operate on the free ends of the racks

and force them into engagement with the second series of number-wheels, as and for the purpose set forth.

4. A series of number-wheels for indicating the amount of a given transaction and a corresponding parallel series of number-wheels for indicating the sum total, and racks engaging with the first-named series and normally pressed by springs out from engagement with the second series, in combination with springs which resist the withdrawal of the racks, a pivoted frame having a trip for the said racks, and a cam for forcing the said racks into engagement with the second series of number-wheels, the positions being such that the cam first causes engagement, as aforesaid, and the trip then operates, as set forth.

5. A series of number-wheels for indicating the amount of a given transaction, a corresponding parallel series of number-wheels for indicating the sum total, racks engaging with the first-named series and normally pressed by springs out of engagement with the second series, separate springs which resist the withdrawal of the racks, a pivoted frame having a trip for the said racks, and a cam for forcing the said racks into engagement with the second series of number-wheels, the positions being such that the cam first causes engagement, as aforesaid, and the trip then operates as set forth.

6. An autographic register, combined with an adding-machine consisting of a series of number-wheels for indicating the amount of a given transaction, a corresponding parallel series of number-wheels for indicating the sum total, and racks engaging with the first-named series and normally pressed by springs out from engagement with the second series, with springs which resist the withdrawal of the racks, a pivoted frame having a trip for the said racks, and a cam for forcing the said racks into engagement with the second series of number-wheels, the positions being such that the cam first causes engagement, as aforesaid, and the trip then operates, as set forth.

7. An autographic register, combined with an adding-machine consisting of a series of number-wheels for indicating an amount of a given transaction, a corresponding parallel series of number-wheels for indicating the sum total, racks engaging with the first-named

series and normally pressed by springs out of engagement with the second series, separate springs which resist the withdrawal of the racks, a pivoted frame having a trip for the said racks, and a cam for forcing the said racks into engagement with the second series of number-wheels, the positions being such that the cam first causes engagement, as aforesaid, and the trip then operates, as set forth.

8. In an adding-machine, the combination, with the lever Z, cam Y, pinion U, and number-wheel V, of the pin z' , slotted arm a , ratchet X, rack P, and spring Q, as set forth.

9. The combination, with an autographic register and the top plate thereof, of a pivoted impression-frame carrying spring-pressed rollers traveling in grooves in the top plate and adjustable type projecting through the top plate in the path of movement of the rollers, as set forth.

10. The combination, with the top plate of an autographic register, of strips of writing-paper with interposed carbon-paper adapted to be fed thereover, a pivoted printing-frame carrying spring-pressed rollers bearing on the said paper, and adjustable type projecting through the top plate in the path of movement of the rollers, as set forth.

11. The combination, with an autographic register having one or more issue-strips with interposed carbon-paper and a locked-up strip, of an adding and printing machine having individual number-wheels and sum-total number-wheels, all the said wheels being adapted to print upon the said strips, as set forth.

12. The combination, with an autographic register having a locked-up strip, of an adding and printing machine having individual number-wheels and sum-total number-wheels, all the said number-wheels being adapted to print upon said strip, as set forth.

In testimony whereof we have affixed our signatures in presence of two witnesses.

JOSEPH MASON.
SAMUEL SHOUP.

Attest as to signature of Joseph Mason:

T. E. NEERGAARD,
C. W. HANKS.

Attest as to signature of Samuel Shoup:

THOS. BRADFIELD,
G. P. DISOSWAY.