

A. J. POSTANS.  
ADDING MACHINE.  
APPLICATION FILED JUNE 4, 1903.

Fig. 1.

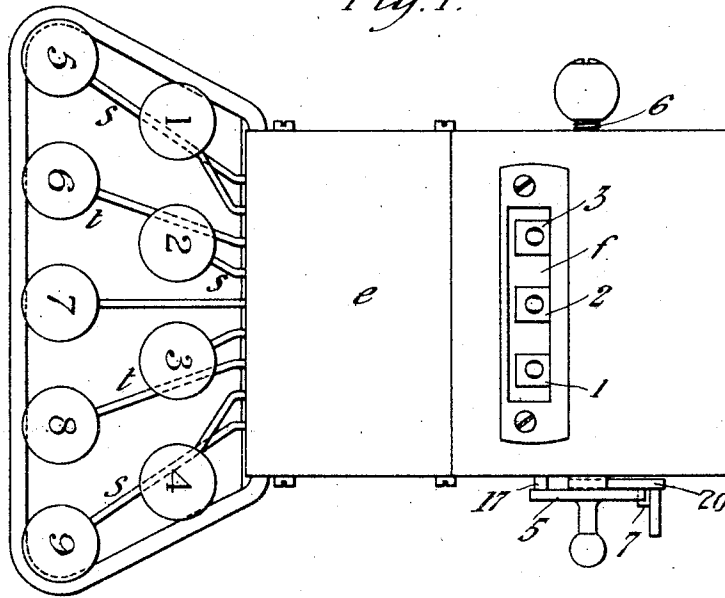
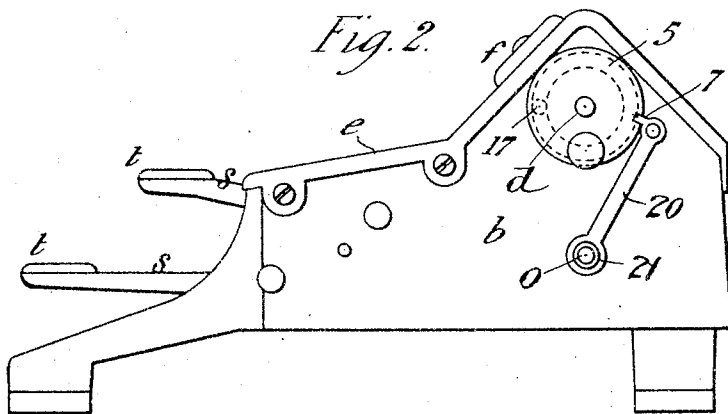


Fig. 2.



WITNESSES

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INVENTOR

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*by Barlow & Rymer*  
*his attys*

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3 SHEETS—SHEET 2.

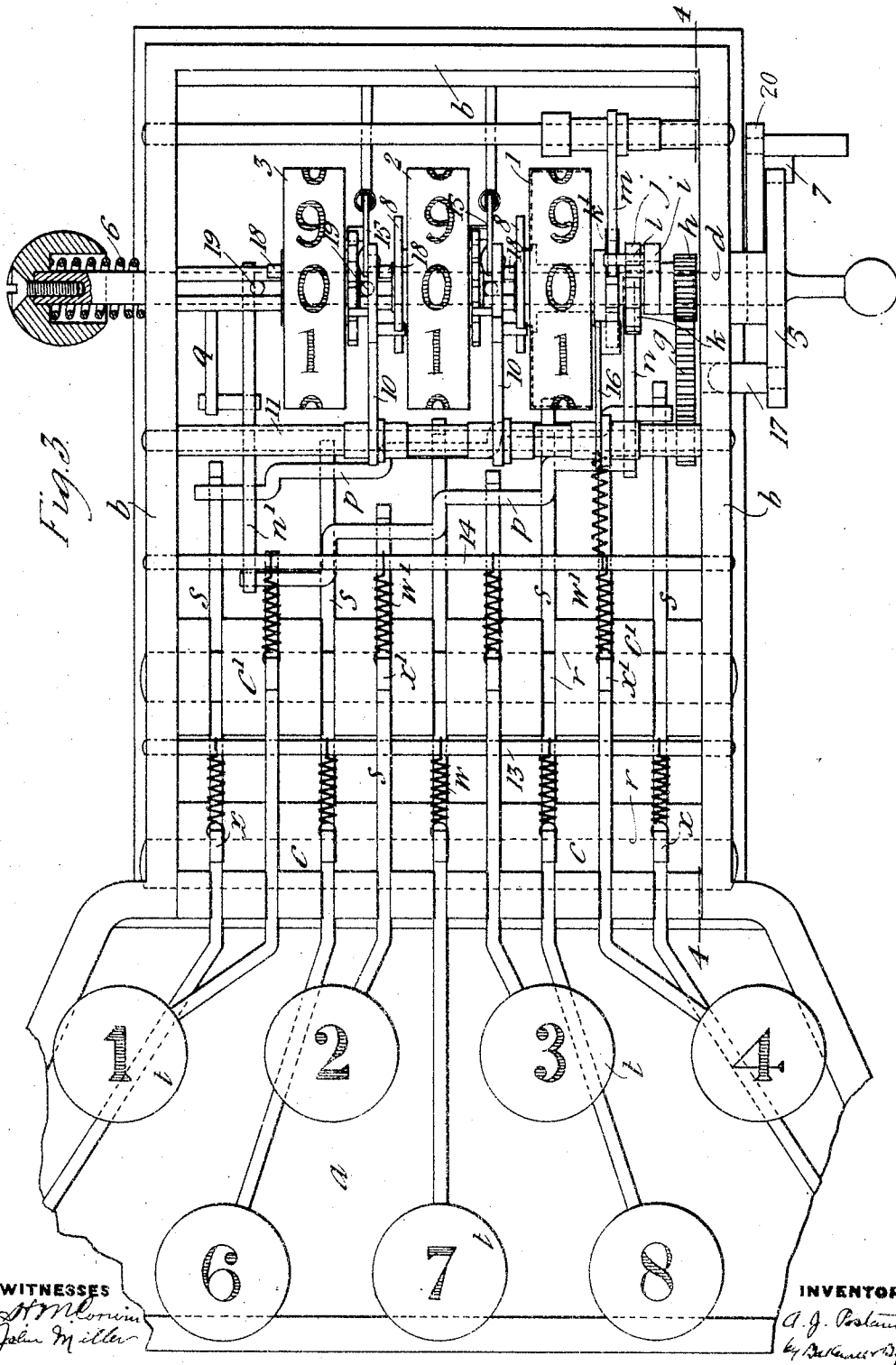


Fig. 3

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# UNITED STATES PATENT OFFICE.

ARTHUR JAMES POSTANS, OF SOUTH KENSINGTON, LONDON, ENGLAND.

## ADDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 786,839, dated April 11, 1905.

Application filed June 4, 1903. Serial No. 160,048.

To all whom it may concern:

Be it known that I, ARTHUR JAMES POSTANS, engineer, a citizen of England, residing at 155 Fulham road, South Kensington, in the county of London, England, have invented certain new and useful Improvements in Adding-Machines, (for which I have applied for a patent in Great Britain, No. 24,868, dated November 12, 1902,) of which the following is a specification.

This invention relates to an adding-machine in which the depression of keys having on them the index-numbers moves a series of drums in such a way that the number formed by the juxtaposition of numerals on their peripheries and appearing through an opening in the casing is increased to the extent of the number appearing on the key that has been depressed.

The accompanying drawings show a machine constructed according to this invention, in which—

Figure 1 is a plan; Fig. 2, a side elevation; Fig. 3, a plan with the cover removed; Fig. 4, a section on the line 4 4 of Fig. 3, and Fig. 5 a detail view, Figs. 3, 4, and 5 being drawn to an enlarged scale.

$a$  is a base-plate, having two sides  $b$  and a back  $b'$  and two series of pedestals  $c c'$  arranged toward the front. On the axle  $d$ , supported by the sides  $b$ , is arranged a series of drums of which three are shown, although there may be a larger number, having numbers printed on their peripheries in consecutive order, the right-hand drum 1 representing units in the completed number, the second drum 2 tens, the third drum 3 hundreds, and so on. When the cover  $e$  is placed over the apparatus, only the one figure of each drum can be seen through the opening  $f$ . The units-drum is operated by a toothed segment  $g$ , engaging with a toothed pinion  $h$ , mounted to revolve freely on the axle  $d$ , and to this pinion is attached a lever  $i$ , carrying a spring-pawl  $j$ , engaging a ratchet-wheel  $k$ , fixed to the units-drum 1. This rocking lever also carries a projection  $l$ , which butts against the hollowed end of a spring-detent  $m$ , pressing it into the teeth of a toothed pinion  $h'$ , so as to stop the motion of the mechanism, and con-

sequently of the units-drum, as soon as the projection  $l$  comes against the detent  $m$ .

The drum is prevented from turning in the backward direction by a spring-detent 16, engaging the teeth of the pinion  $h'$ . The toothed segment  $g$  constitutes one arm of a three-armed lever, which is mounted on a shaft  $o$ , supported in the sides  $b$ . The second arm  $n$  of the lever has a cross-arm extending above and below at an angle from it in the form of a T, to the extreme ends of which are connected two stepped bars  $p$ , which are connected at their other ends to a similar T-ended lever  $n'$ , mounted at the other end of the shaft  $o$ . The toothed segment  $g$ , its levers  $n n'$ , and bars  $p$  are brought back into their normal position by a spring  $v$ , attached to the third arm  $n^2$  of the lever and to the back  $b'$  of the apparatus.

The bars  $p$ , which are stepped, as shown, rest on a series of levers  $s$ , hooked at their inner ends and mounted on spindles  $r$ , supported in the pedestals  $c c'$ , the outer ends of each of which levers are formed as finger-keys  $z$ , having index-numbers marked thereon and arranged in two rows, one above the other, as shown. The hooked ends of the levers  $s$  are made of varying lengths, proportionate to the index-numbers marked on the keys, and by their action on the stepped bars  $p$  they cause the toothed segment  $g$  to travel through a smaller or greater arc, according as to whether the key marked with a "1" or a key marked with a higher number is depressed. These levers are brought to their normal position by springs  $w w'$ , connected to eyes  $x x'$ , formed in the levers and attached to bars 13 and 14, fixed to the sides  $b$  and extending across the machine. By arranging the levers  $s$  in two rows and the bars  $p$  in stepped form and making the lower row of levers which have to give the longer travel to the segment  $g$  engage the bars  $p$  at a greater distance from the axis than the upper levers the amount of travel of the finger-keys necessary to give the desired impulse to the indicating-drums is compensated, thus rendering the stroke of all the finger-keys equal.

The carrying over from one drum to the next can be effected in any known manner; but, as shown in Fig. 5, the drums 1 and 2

are each provided with a snail-cam 8, on the edge of which bears a pin 9, projecting from a lever 10, mounted on the bar 11 and carrying at its extreme end a pawl 15, engaging with the teeth of a ratchet-wheel 12, one of which is fixed to each of the drums 2 and 3. As the cam 8 revolves it gradually raises the lever 10, and consequently its pawl 15, in opposition to a spring 15<sup>a</sup> until the pawl engages the next tooth of the wheel 12, when the pin 9, having arrived at the highest point of the cam 8, suddenly drops in obedience to the strain of the spring 15<sup>a</sup>, causing the drum to move one division, its further movement being prevented by a stop 10<sup>a</sup>, carried by the lever 10, bearing against a tooth of the wheel 12.

The operation of the machine is as follows: The finger-key marked with the number which is to be added being depressed causes the hooked end of the lever *s* to rise, and this acting on one of the bars *p* and the rocking levers *n n'* causes the segment *g* to travel through an arc the length of which is dependent on the number depressed. This movement of the segment *g* turns the pinion *h* and with it the lever *i* and its pawl *j*, which travels over a number of teeth of the ratchet-wheel *h* corresponding with the number on the finger-key which has been depressed. On releasing the finger-key the spring *v* acting on the three-armed lever causes the segment *g* to return to its normal position, thereby moving the pinion *h*, its lever *i*, and pawl *j* in the reverse direction. In doing this the pawl *j* turns the pinion *h*, causing the units-drum 1 to travel round the number of spaces represented by the number on the key depressed, the other drums being caused to revolve in their turn by the carrying-over gearing. The extent of movement of the segment *g* is determined and its overrunning prevented by the hooks at the inner ends of the levers *s*, which lock the segment at the end of its stroke. The movement of the units-drum is also determined and its overrunning prevented by the projection *l* butting against the detent *m* at the end of its stroke and pressing *m* into one of the teeth of the pinion *h'*, thus preventing the drum registering more than the number represented by the key depressed.

In order to return the indicating-drums to their zero position to enable a fresh addition to be made, the axle *d* has fixed on one end a hand-wheel 5, and on the other end is mounted a spring 6 to keep this hand-wheel in its locked position, which is done by a stud 17 entering a hole in the side *b*. The wheel 5 is also locked by a catch 7, formed at the end of a spring-lever 20, fixed to a collar 21, attached to the shaft *o*, on which the rocking segment *g* is free to move and on which there is a rocking lever *q*, which raises the bars *p* slightly.

It will be seen from Fig. 4 that the pawl *m* is only kept in engagement with the pinion *h'* by the pressure of pin *l*, which is carried by

the lever *i*, attached to the pinion *h*. When the lever 20, Fig. 2, is moved to the left to disengage catch 7, the shaft *o*, to which the lever 20 is fixed, is rocked sufficiently to cause the lever *q*, Fig. 3, also fixed to the shaft *o*, to lift the lever *n'* and through the bars *p* the arm *n*. The quadrant *g* is thus rocked a little to the right and the lever *i* correspondingly to the left, releasing the pressure of pin *l* on pawl *m*, which being normally spring-pressed toward the stop *m'* is therefore raised by its spring and disengaged from the pinion *h'*.

By pressing the axle *d* against the pressure of spring 6 the stud 17 is released from its hole. If now the catch 7 be pressed outward, the wheel 5 can be turned and at the same time the segment *g* is rocked slightly by the movement of the lever *q*, disengaging the pawl *m* and allowing the units-drum to be moved. In that radius of each indicating-drum which terminates with zero is a pin 18, projecting from the drum or its snail parallel with the axle *d*. This axle carries three corresponding pins 19, projecting through longitudinal slots in collars surrounding the axle *d*. When the shaft is pressed to release the handle-wheel 5, the pins 19 come into line with the pins 18, and when the axle *d* is rotated they engage with each other, and thus cause the indicating-drums to revolve until all the drums are brought into the zero-line when the stud 17, coming opposite its hole in the side *b*, is drawn in by the pressure of the spring 6. At the same time the catch 7 again takes into its slot in the hand-wheel and the units-drum is once more locked, all the drums showing zero in the opening of the casing.

Having thus described the nature of my said invention and in what manner the same is to be performed, I claim—

1. An adding-machine comprising a number of key-levers each of different effective length, a bar lifted by each lever when the latter is depressed, a hook on the end of each lever to engage the bar and thus determine the lever's stroke, a units-drum and mechanism for causing the movement of the bar to determine the rotation of the drum through an angle corresponding with the extent of the said movement; substantially as described.

2. An adding-machine comprising a number of key-levers each of different effective length, a stepped bar with a separate step of which each lever engages a hook at the end of each lever to engage the bar and thus determine the lever's stroke, a units-drum and mechanism for causing the movement of the bar to determine the rotation of the drum through an angle corresponding with the extent of the said movement; substantially as described.

3. An adding-machine comprising a number of key-levers each of different effective length, a stepped bar with a separate step of which each lever engages, a hook at the end of each lever to engage the bar and thus determine

the lever's stroke, a units-drum, a rocking lever connected with the said bar, a toothed segment carried by the said rocking lever, a pinion on the shaft of the drum gearing with the said segment, a lever-arm fixed to the said pinion, a pawl carried by the said lever-arm and adapted to engage with a ratchet fixed to the said units-drum, a projection on the said lever-arm, a spring-detent on which the said stop presses to force it into engagement with a toothed wheel on the units-drum and a spring adapted to return the said rocking lever to its normal position when the key-lever has been released; substantially as described.

4. An adding-machine comprising a number of key-levers each of different effective length, a stepped bar with a separate step of which each lever engages, a hook at the end of each lever to engage the bar, a series of drums each mounted free on a spring-urged shaft, mechanism for causing the movement of the bar to determine the rotation of the units-drum of the said series, collars on the said shaft, a hand-wheel on one end of the said shaft, a device normally locking the said wheel to the frame of the machine, pins at suitable distances apart projecting through slots in the said collars and a pin projecting from each drum in such a manner that when the said shaft is pressed against the spring-pressure to free the said hand-wheel and the latter is

rotated, the said pins on the shaft engage with those on the drums; substantially as described.

5. An adding-machine comprising a number of key-levers each of different effective length, a stepped bar with a separate step of which each lever engages, a hook at the end of each lever to engage the bar, a series of drums each mounted free on a spring-urged shaft, mechanism for causing the movement of the bar to determine the rotation of the units-drum of the said series, collars on the said shaft, a hand-wheel on one end of the said shaft, a device normally locking the said wheel to the frame of the machine, pins at suitable distances apart projecting through slots in the said collars, a pin projecting from each drum in such a manner that when the said shaft is pressed against the spring-pressure to free the said hand-wheel and the latter is rotated, the said pins on the shaft engage with those on the drums, and a spring-lever engaging in the said hand-wheel and adapted to unlock the units-drum; substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ARTHUR JAMES POSTANS.

Witnesses:

EDWARD GARDNER,

W. M. HARRIS.