

N. ROWLAND.  
Calculating Machine.

No. 51,972.

Patented Jan'y 9, 1866.

FIG. 2.

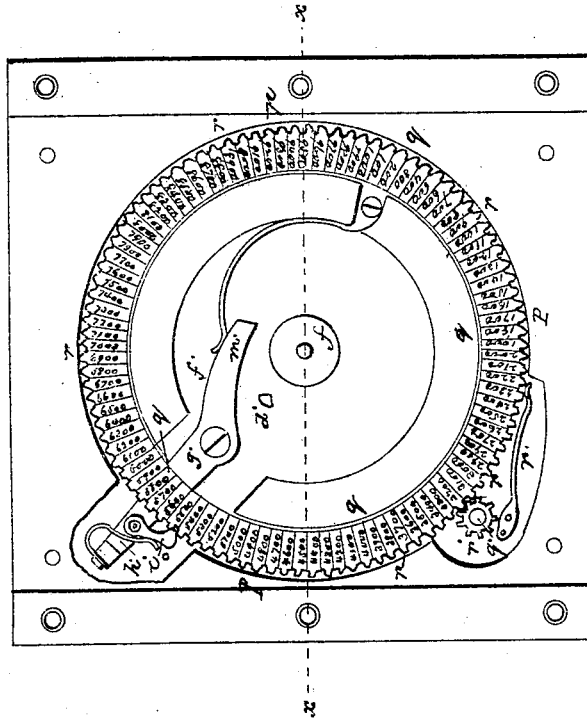


FIG. 3.

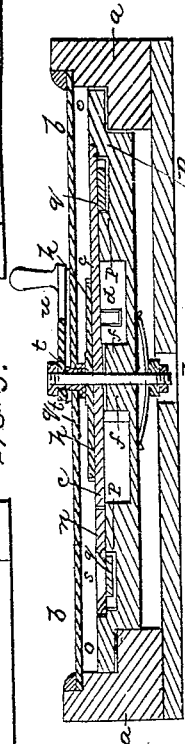
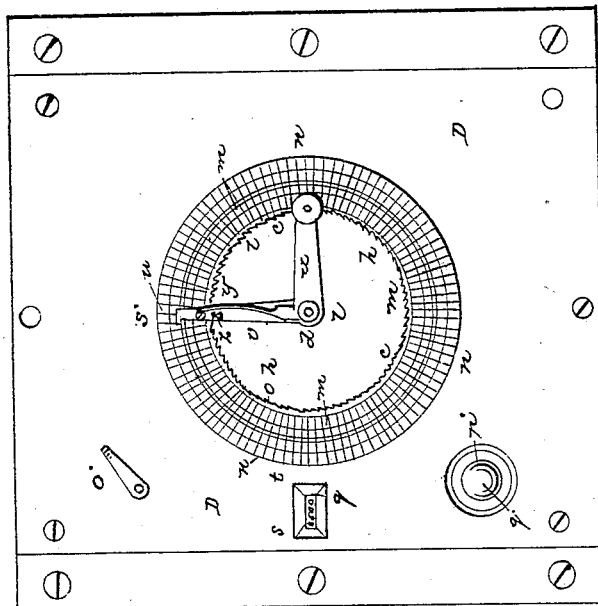


FIG. 1.



WITNESSES:

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## IMPROVEMENT IN CALCULATING-MACHINES.

Specification forming part of Letters Patent No. **51,972**, dated January 9, 1866.

### *To all whom it may concern:*

Be it known that I, NEWTON ROWLAND, of Hilltown, in the county of Bucks and State of Pennsylvania, have invented new and useful Improvements in Calculating-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

The present invention consists in the use of a horizontal circular disk graduated upon its upper face into one hundred equal parts, numbered from 1 to 100, inclusive, so arranged as to be revolved at pleasure, placed and moving around within an outer stationary concentric ring, similarly graduated and numbered, but in the opposite direction to that of the disk, in combination with a horizontal revolving ring divided into one hundred equal parts, numbered by the hundreds from 100 to 10,000, inclusive, which ring is so constructed and connected, through suitable mechanical devices, with the revolving disk that upon and for every complete revolution of the same it shall be moved one division, or one one-hundredth of its circumference.

The object of my improvements and the purpose for which they are intended are the computation or the addition of one number to another, or of several numbers, and the peculiar manner in which the same are operated will be presently described.

My improvements are represented in accompanying plate of drawings, of which Figure 1 is a top view of my improved calculating-machine. Fig. 2 is a plan of the same with the top plate removed, and Fig. 3 a vertical sectional view in plane of line *x x*, Fig. 2.

*a a* in the drawings represent the outer casing or box, in which the mechanical devices constituting the machine are placed, made of any desired shape and style and having a plate of glass, *b*, for protecting the devices from corrosion or injury.

*c* is a circular disk placed horizontally within the center of the box and attached to a vertical shaft, *d*, turning in bearings of the lower portion, *f*, of the same and extending upward through an aperture, *g*, in the glass *b*.

To and upon the upper face of the circular

disk *c*, and either secured thereto or formed in one and the same piece therewith, is a wheel, *h*, of smaller diameter than the disk, and having a series of teeth, *l l l*, one hundred in number, corresponding to which and upon the portion *m* of the disk, outside of the same, one hundred equal divisions are marked and numbered from 1 to 100, inclusive.

*n n* is a circular ring, of little larger internal diameter than the diameter of the disk *c*, attached to or formed in one and the same piece with a square plate of metal, *o*, placed and secured in a horizontal position within the box, with its ring *n* around the disk, and in the same horizontal plane, by means of screws or any other proper devices, which ring is also divided into one hundred equal parts, and numbered as before described for the disk, but in an opposite direction thereto.

Placed below and underneath the plate *o*, and moving within a circular groove or way, *p*, of the box *a*, is a horizontal ring, *q*, divided into one hundred equal parts, numbered by the hundreds from 100 to 10,000, and having a series of teeth, *r r*, upon and around its outer edge or periphery, corresponding in number to the said divisions, which numbers, as will be presently described, are in regular succession brought to the opening *s* of the plate *o*.

On the upper portion of vertical shaft *d*, and turning loosely on the same, is a short sleeve, *t*, on the upper end of which, and outside of the glass, is secured a crank-handle, *u*, and to the lower end a projecting or radiating arm, *v*, bearing and moving by its outer end upon the graduated disks, and having a pointer or index, *w*, projecting therefrom in a radial line from the center of the sleeve.

*y* is a spring-pawl, hung by a pivot, *z*, in arm *v* of sleeve in proper position to interlock with the teeth of its toothed portion of the disk.

To use the machine, first set the division of the disk marked 100 opposite to the similar-numbered division of the fixed ring upon the outside of it. Next bring the index over, and so as to point to the same, and then move the index, by its handle *u*, in the direction in which the divisions of the fixed ring are numbered until it comes over the number of the same corresponding to the first number of the series to be added together, correspondingly revolving at the same time the

disk *c* by the interlocking of its spring-pawl with the teeth of the same. Then bring the index back to its original position—that is, over the one-hundredth division of the fixed ring, the spring-pawl freely passing over the toothed disk, when again move it, in a similar manner as before described, to the division-number of the ring corresponding to the next number of the series to be added, thus by its pawl again correspondingly revolving the disk, and so on until the entire series of the numbers to be added are exhausted, when the sum total thereof, if equal or less than ten thousand, is indicated in its hundreds at the opening in the plate *o*, as is now to be described, and in its tens and units upon the disk by its number to the "100" of the fixed ring; but upon each complete revolution of the graduated disk, moved as above described, or when its "one hundred" division has reached the similar-marked division of the fixed ring, the lower ring, *q*, divided and numbered as specified, is then caused to be moved within its groove one graduation, thus bringing the next number in order to the opening *s* by means of the following arrangement of devices, viz: *d'*, a projecting stud or pin on lower side of circular disk; *f'*, a spring-lever turning on a fulcrum, *g'*, extending outward under and beyond the movable ring *q*, and having on its outer end, *b'*, a spring-pawl, *l'*, engaging with the teeth of said ring. Against the inner end, *m'*, of the spring-lever *f'* the stud *d'* of the disk as it is revolved impinges, sufficiently turning it on its fulcrum as to cause the pawl to move the ring one division, when, the stud leaving the lever, it resumes its original position and the pawl interlocks with the next tooth through the action of their respective springs, the stud being secured on the disk in the proper position to actuate the lever, as described, at or near the moment when it has made its complete revolution.

From the above it is manifest that by my improved calculating-machine the addition of any series of numbers by simply operating the graduated disk, as described, can be readily

and easily accomplished, and with the assurance of perfect accuracy in its result as indicated by the graduated ring and disk, the advantages of which in the calculation of long rows of figures—such as, for instance, in the estimating of lumber—are many and very important.

To reset the machine after having once been used for another calculation, first disengage the pawl from the graduated ring by turning the handle *o'* toward the right, then by the milled head *p'* on the shaft *q'* of the pinion *r* interlocking with the teeth of the ring move the ring until its division marked 100 is at the opening *s*, after which, still holding the pawl away from the ring, bring the one-hundredth division of the circular disk opposite to the same numbered division of the fixed plate, when it is ready for use.

In the backward movement of the radiating arm used for revolving the disk, as has been hereinbefore described, in order to prevent any possibility of moving the same beyond the proper joint of the graduated plate, I have attached thereto a stop, *s*, which bears upon the plate and drops into a notch, *t'*, of the same, by which the arm is held and prevented from moving too far, as is evident without further description.

*v'* is a spring-rod engaging with teeth of graduated ring, which is used as a check upon the spring-pawl and to prevent the ring from being moved too far.

I claim as new and desire to secure by Letters Patent—

The arrangement of the machine consisting of the revolving graduated toothed disk operated by the arm and spring-pawl, the intermediate stationary graduated annulus, and the outer graduated and revolving annular plate, upon whose face the valves of the inner revolving disk are centuplicated, as described and represented.

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Witnesses:

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