

No. 858,856.

PATENTED JULY 2, 1907.

H. E. BROWN.  
ADDITION TESTER.  
APPLICATION FILED AUG. 14, 1905.

FIG. 1.

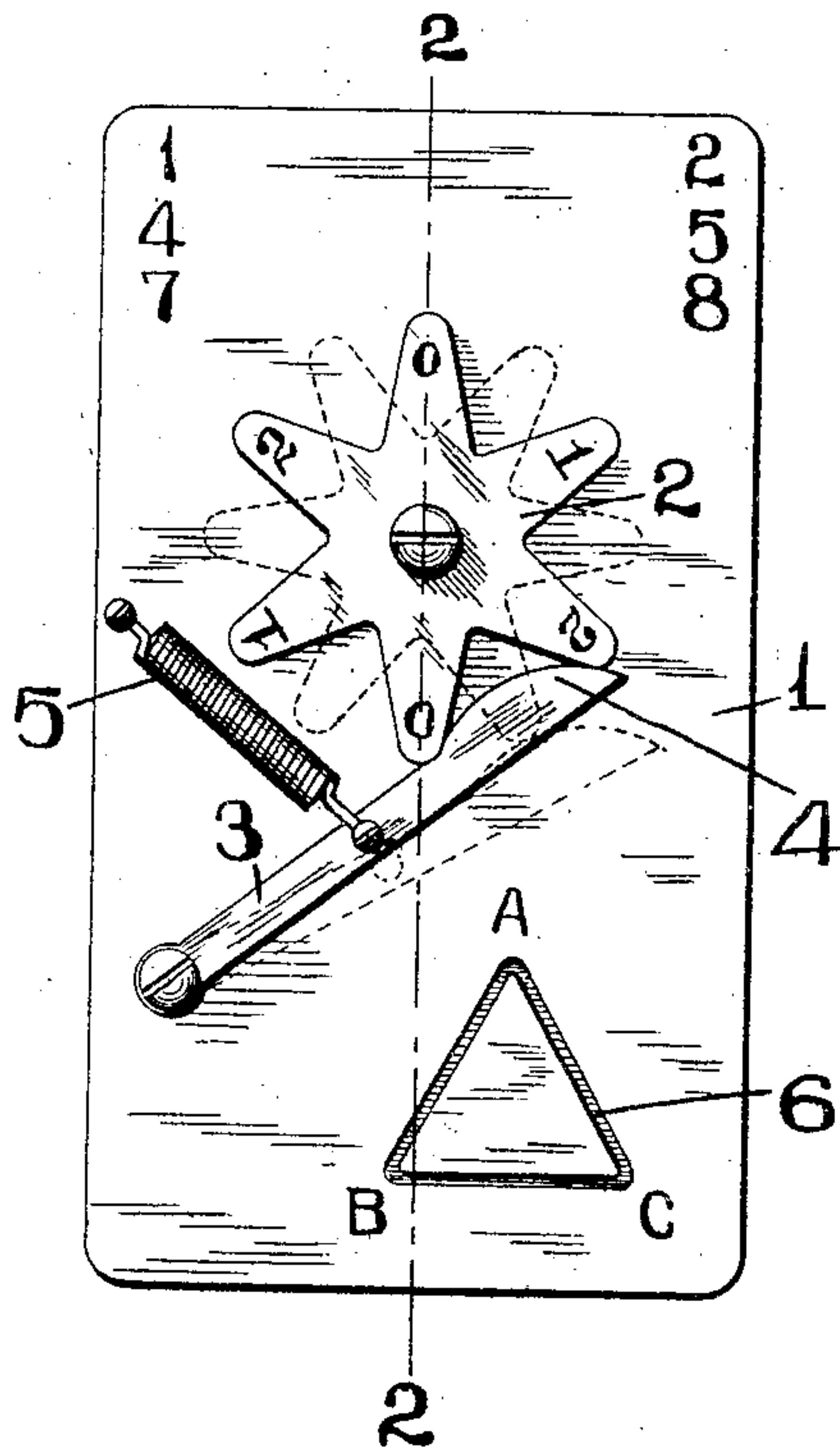
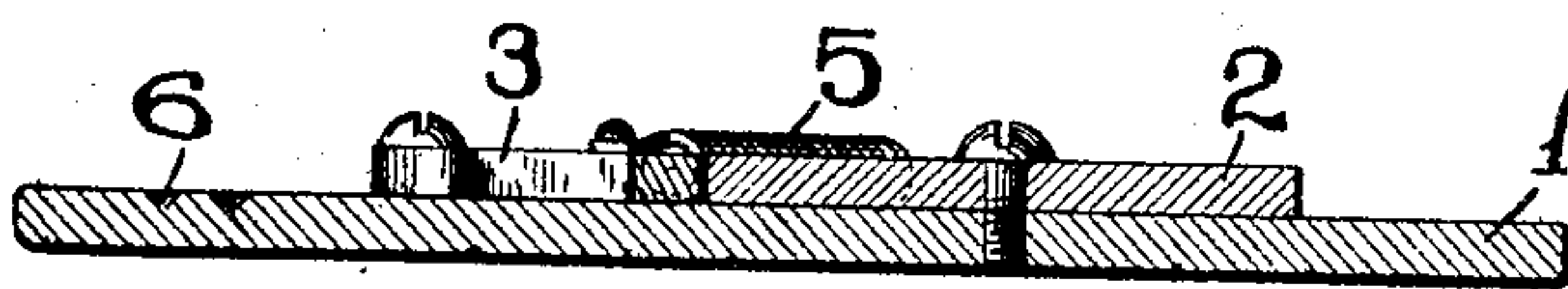


FIG. 2.



ATTEST.

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## ADDITION-TESTER.

No. 858,856.

Specification of Letters Patent.

Patented July 2, 1907.

Application filed August 14, 1905. Serial No. 274,176.

*To all whom it may concern:*

Be it known that I, HUGH E. BROWN, a citizen of the United States, and a resident of Browns Station, Boone county, Missouri, have invented certain new and useful Improvements in Addition-Testers, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to an addition tester, and is an improvement on the addition tester patented by me February 3, 1903, No. 719,734, and the object of my invention is to provide a much simpler and cheaper device for testing the correctness of addition than the device shown in my patent above referred to.

My invention consists in certain novel features of construction and arrangement of parts which will be hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which

Figure 1 is a face view of an addition tester constructed in accordance with my invention; Fig. 2 is a longitudinal section taken on the line 2—2 of Fig. 1;

Referring by numerals to the accompanying drawings: 1 indicates a plate, preferably rectangular, upon which is rotatably arranged a star wheel, 2, which is preferably provided with six arms, or fingers, although said wheel may be provided with fingers, or teeth, the number of which is three, or a multiple of three. As stated, I have shown this wheel, 2, with six arms, or fingers, and two of said arms, or fingers, which are oppositely arranged are marked with indicating characters "0." Another oppositely arranged pair with the numbers "1—1," and the remaining oppositely arranged pair with the numbers "2—2." Upon the upper left hand corner of the plate, 1, appears the numbers, 1, 4, and 7; and upon the upper right hand corner of the plate appears the numbers 2, 5, and 8.

Pivotaly mounted upon the face of the plate, 1, is a pawl, 3, the free end of which is rounded, as indicated by 4, and is of such a size as that it readily engages between the arms of the wheel, 2. A retractile coil spring, 5, is secured at one end to this pawl, 3, and at its opposite end to the left hand side of the plate, 1; and said spring is of such strength as that it retains the rounded end of the pawl between the arms of the wheel, yet allows said wheel to be readily turned in either direction.

Formed in the face of the plate, 1, below the pawl, 3, is a groove, 6, which is arranged in the form of an equilateral triangle, the apex thereof being marked with the letter "A," the lower left hand corner with the letter "B," and the lower right hand corner with the letter "C."

It is a well known fact that any number, or the sum of any series of numbers, when divided by threes will leave as a remainder either naught, one, or two. In

the multiple of three test of addition, the threes and multiples of three are cast out of the sum of the digits of the numbers added by casting the threes out of the first digit, adding the resulting remainder to a second digit, casting the threes out of the resulting sum, adding the resulting remainder to the next digit, casting out the threes, and so on. The resulting last remainder is called the final remainder, or check-figure. For example, in testing the addition of 85 and 42, the sum of which is 127; the 3's cast out the first digit, 8, leaves a remainder of 2. Adding this remainder to the next digit, 5, and casting the 3's out of their sum, 7, leaves a second remainder, 1. Adding this second remainder to the next digit, 4, and casting the 3's out of their sum 5, leaves the third remainder 2. Adding this third remainder to the next digit 2 and casting the 3's out of their sum 4 leaves the fourth remainder 1, which is the final remainder, or check figure. Now the threes and multiples of three are cast out of the digits of the sum, and the remainder is the second check-figure. If the two check-figures are the same, no error unless an error or errors of three or a multiple of three has been made in the addition; but if the two check-figures are different, then this indicates that an error has been made.

The following methods may be employed in the use of my improved addition tester: To cast out the threes, the arms of the wheel, 2, bearing the "0s" are arranged so that they are parallel with the sides of the plate; then, said wheel is moved one notch to the left for each 1, 4, and 7; and one notch to the right for each 2, 5, and 8, making no movement for a 0, 3, 6, or 9. When the figures of the addition that is being tested have all been gone over, or indicated, by movements of the wheel, the check-figure will be upon the arms of said wheel that are parallel with the sides. For example, to find the check-figure of 125. Having the "0s" of the indicator parallel with the sides of the plate, 1, the wheel is moved one notch to the left for the 1, one notch to the right for 2, and one notch further to the right for the 5. Then, the "2" on the arms of the wheel that are parallel with the sides of the plate is the check-figure of 125, when the threes are cast out.

To test addition, (1st method,) find the check-figure of the numbers that are added, and then the check-figure of the sum of the figures that are added; and these check-figures agree, if the addition is correct.

To test addition, (2nd method,) find the check-figure of the numbers added, and if it be a zero, proceed with movements for figures in the sum. For "1," move the wheel one notch to the left before proceeding. For "2," move the wheel one notch to the right before proceeding. Then, when movements have been made for the figures of the sum, the arms, indicated by "0," of the wheel will be parallel with the sides of the plate, if the addition is correct.



(3rd method:) Proceed the same as in finding the check-figure for the numbers added. Reverse the direction of the movement for the figures in the sum, and, if the addition is correct, the arms of the wheel, which are indicated by "0," will be parallel with the sides of the plates: For example, in adding 25 and 10, the sum of which is 35, the wheel is moved one notch to the right for "2," one more notch to the right for "5," one notch to the left for "1," no movement for the "0," or the "3," and, as the remaining "5" is in the sum, move the wheel one notch to the left for said "5." The adding being correct, the arms of the wheel bearing the characters "0," are parallel with the sides of the plate.

None of these methods detect an error of three, or a multiple of three.

In testing addition by means of the triangular groove formed in the face of the plate, 1, a pencil point is placed in the apex of the triangular groove, at "A," and for the figures in the numbers that are added, move the pencil point as follows: one space from A to B, from B to C, and from C to A, for every 1, 4, and 7; and one space in the opposite direction for every 2, 5, or 8. For figures in the sum, move the point one space in the direction A to C, C to B, and B to A, for every 1, 4, or 7; and one space in the opposite direction for every 2, 5, or 8. No movement is made for a 0, 3, 6, or 9. When movements have thus been made for every 1, 4, 7,—2, 5, and 8, the pencil point will, if the addition be correct, be at "A," the starting point. For example: when adding 28 and 15, the sum of which is 43, move the pencil point from A to C for 2, from C to B for 8, from B to C for 1, from C to B for 5, and from B to A for 4. This leaves the pencil point at "A," showing that the addition is correct.

An addition may also be tested, and the threes cast out by means of moving a pointer, or pencil, along a

zigzag line, the points of the angles of which are suitably numbered, or by using a triangle, or other plane figure, the sides or divisions of which number three, or a multiple of three, and the angles or divisions of which are suitably numbered, or indicated.

Any of the above mentioned figures with lines, sides, or divisions so grooved as to guide the pencil, or pointer, may be stamped or cut on the face of the plate, 1, and used independently of, or in connection with, the wheel, for testing addition, and for fundamental, arithmetical operations. For example: in testing addition by using both the wheel and triangle:—find the check-figure of numbers added by using the wheel, and then find the check-figure of the sum by using the triangle, and, if the addition is correct, the check-figures will agree.

I do not wish to confine myself to any particular form of pawl, or any particular shape of wheel, it only being necessary to provide a wheel having teeth to the number of three, or a multiple thereof.

An addition tester of my improved construction is simple, inexpensive, easily operated, and is of great assistance to clerks, book-keepers, and mathematicians.

I claim:

In a device of the class described, a plate, a toothed wheel arranged for rotation thereon, the teeth of which wheel are rounded at their outer ends and provided with indicating characters, a spring actuated pawl, having a rounded point engaging between the teeth of the wheel, and there being indicating characters arranged on the plate on opposite sides of the wheel; substantially as specified.

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

HUGH E. BROWN.

Witnesses:

W. A. BRIGHT,  
S. HUNT.