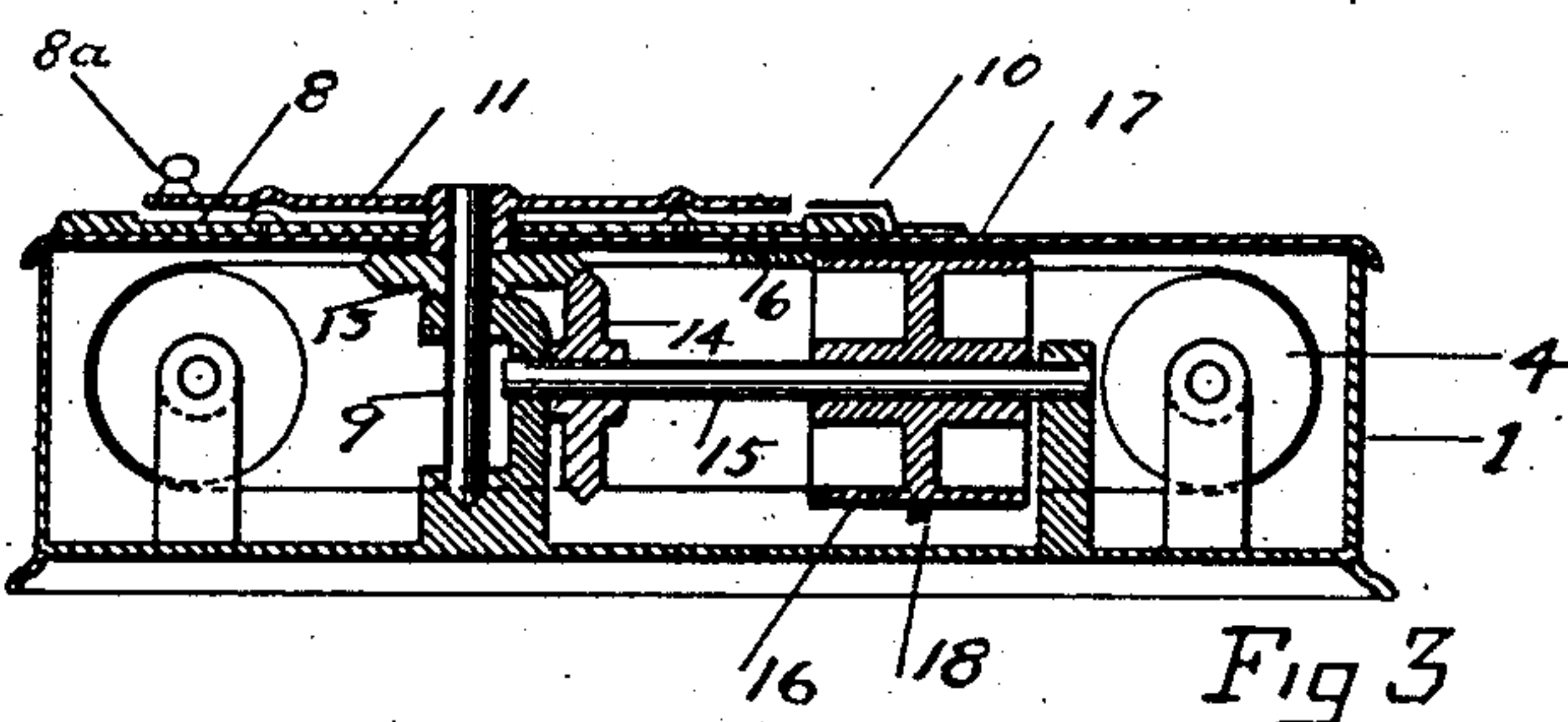
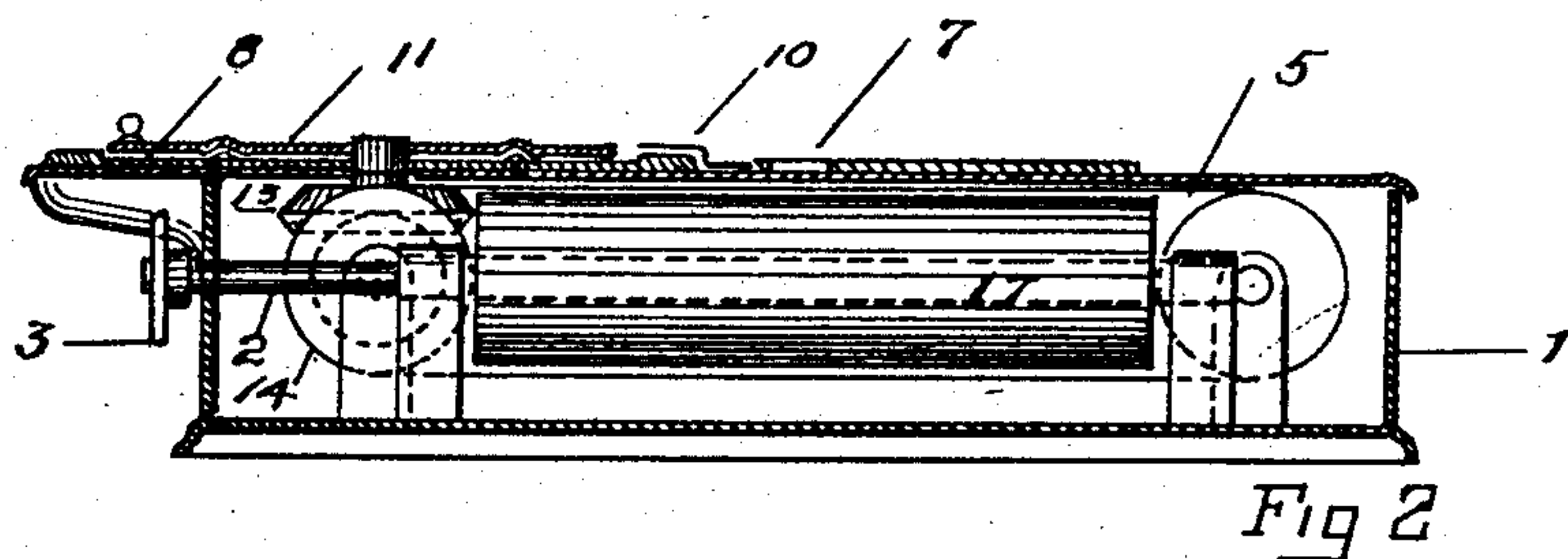
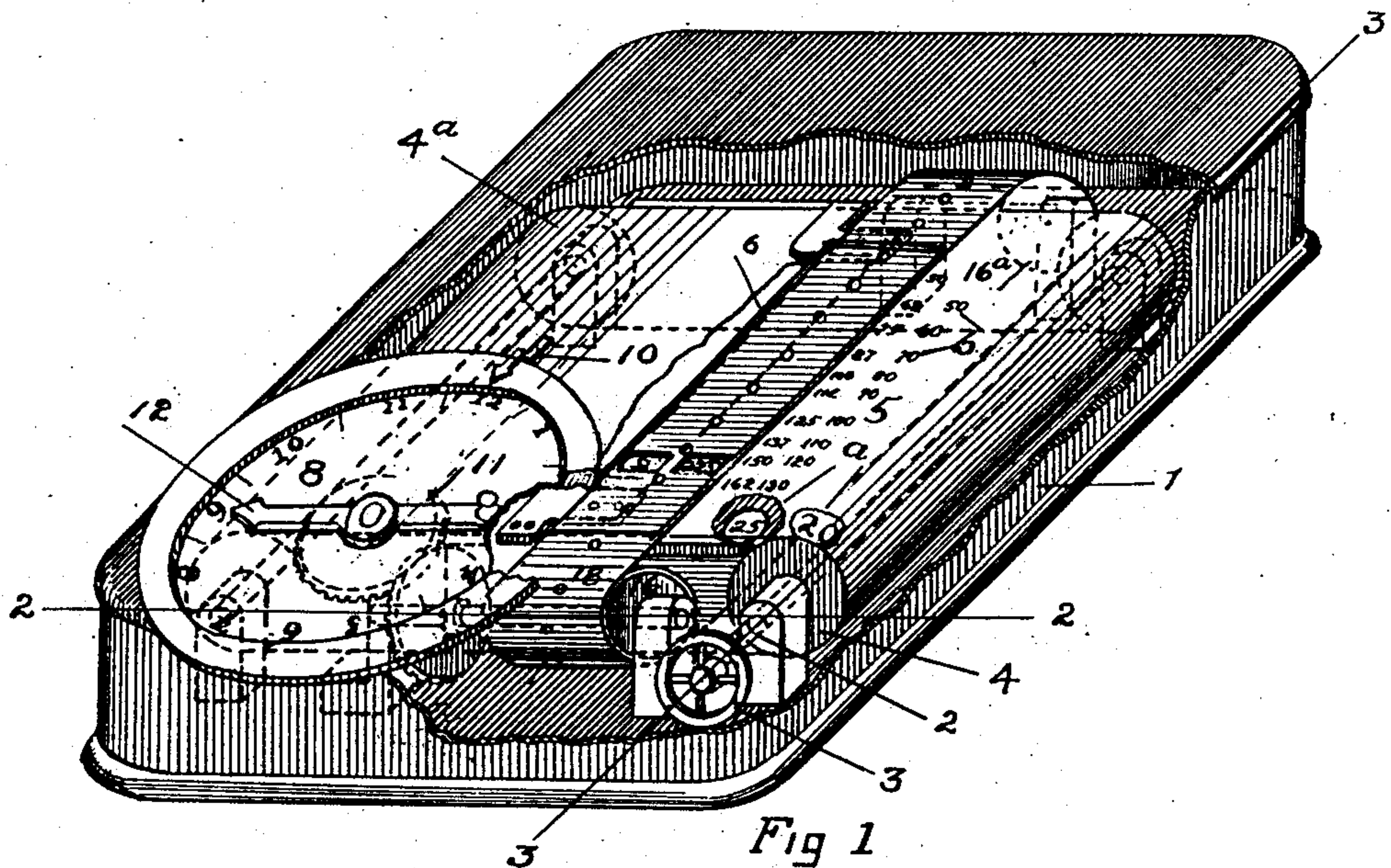


F. E. WEBNER.  
MECHANICAL CALCULATOR.  
APPLICATION FILED SEPT. 9, 1907.

997,483.

Patented July 11, 1911.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## MECHANICAL CALCULATOR.

997,483.

Specification of Letters Patent.

Patented July 11, 1911.

Application filed September 9, 1907. Serial No. 391,895.

*To all whom it may concern:*

Be it known that I, FRANK E. WEBNER, a citizen of the United States, resident of Norwood, county of Hamilton, and State of Ohio, have invented a certain new and useful Improvement in Mechanical Calculators, of which the following is a specification.

The object of my invention is to provide novel, simple and efficient means for mechanically calculating elapsed time or making other calculations involving subtractions; means for mechanically calculating wages, or prices, or making other multiplications; and to produce calculating mechanism which requires no mathematical calculations on the part of the operator, and which dispenses with the use of key boards or equivalent devices which require manipulation for each digit of the number to be treated.

My invention consists in the parts and combination and arrangement of parts hereinafter described and claimed.

I have illustrated my invention as applied to wage computation upon the time system, but it is equally applicable to wage computation upon the piece system or to price computation, or to any computation wherein it is practicable to deal with a selected number of multipliers and multiplicands. For convenience the wage rate will be treated as the multiplicand, the elapsed time as the multiplier and the product obtained by multiplication of the figures denoting the wage rate by the figures denoting any period of elapsed time as the multiple.

In the drawings Figure 1 is a top plan view with a portion of the casing broken away; and Fig. 2 a vertical section on the line 2—2 of Fig. 1.

The numeral 1 designates a casing, 2 a shaft rotatably mounted in suitable bearings and adapted to be actuated by a hand wheel 3. The shaft carries a pulley 4 which, with a corresponding pulley 4<sup>a</sup>, carries a belt 5. The belt carries in series, arranged longitudinally, numerals *a* denoting selected wage rates or multiplicands, and also carries in column, disposed transversely of its length, series of numerals *b* each series denoting selected multiples of one of the selected wage rates or multiplicands. A plate 6 fixed to the casing carries a series of numerals denoting time or other selected mul-

tipliers. The casing has an opening 7, preferably covered with glass, above the plate 6, and of sufficient width to include the plate 6 and one column of multiples on the belt 5. By rotation of the shaft 2, any column of numerals denoting multiples may be brought into juxtaposition with the time or multiplier series and under the opening 7.

8 indicates a gage or dial plate rotatably mounted upon a shaft 9, graduated to correspond with the time or multiplier series on plate 6, movable independently of the other mechanism. A stationary pointer or other index mark 10 is provided for setting the dial plate which is preferably provided with knobs 8<sup>a</sup> whereby it may be rotated by hand. A hand lever 11 carrying a pointer 12 is fixed to shaft 9 immediately above the dial plate. Shaft 9 carries a spur gear 13 adapted to engage with a spur gear 14 on a shaft 15 upon which is mounted a sprocket wheel 16 which with a corresponding wheel 16<sup>a</sup> carries a belt 17 preferably of sheet steel provided with openings registering with pins 18 on sprocket wheel 16. The belt is arranged to travel under the opening 7 in the casing and over the plate 6 and over a positioned column of multiples, and is provided with slits 19 adapted to disclose one multiplier and the corresponding multiple. The graduation on the gage, or dial, plate, is such that movement of the hand lever 11 one step relatively to the dial plate, moves the traveling belt 17 one step relatively to the multiplier and multiple series. The elapsed time indicated depends upon the position of the hand bar in its arc of travel. The stationary pointer marks the no degree and the 360 degree point. Its primary function is to designate a point in the circle which counts as zero in the measurement of the arc.

In operation, the hand wheel 3 is turned to bring the proper rate into view in peep hole 20. The dial is set to bring the time of beginning work as indicated by the wage slip opposite the pointer 10. The hand lever 11 is then turned from whatever position it may occupy to the time of finishing work as denoted by the dial plate. This brings the slits in belt 17 over the figures denoting the elapsed time and the figures denoting the multiple of the wage rate by the numerals denoting the elapsed time. In the illustration the wage rate 25 is posi-



tioned, the dial is set to 12 as the time of beginning work, and the hand lever to 9 as the time of finishing work, and the slits disclose 9.00 as the elapsed time and 2.25 as the wage for that time. The plate 6 with its series of numerals indicates time periods generally. The belt 17 with its slits, selects and points out, or indicates, a specific time period, or multiplier, and a specific multiple, in accordance with the position of the hand bar in its arc of travel.

The work of the operator is purely mechanical. He has only to select and position the proper rate, set the dial to the time of beginning work, turn the hand bar to the time of finishing work, and copy the figures. If the rate, and elapsed time on the next slip are the same, he has only to copy the figures. If the rate and time of beginning work are the same, but the time of finishing differs, he has only to turn the hand bar to the time of finishing and copy the figures.

When the machine is to be used for calculating wages for piece work or making other calculations not involving subtraction, the dial plate 8 need not be movable as the calculation always starts from naught.

While I have illustrated the dial as graduated in half hour periods, it will usually be graduated to such shorter periods as denote the shortest period of time which is taken into account in figuring wages, and the multipliers and multiples will be arranged to correspond.

I claim as my invention:

1. The combination, in a calculating machine, of time indicating members; an actuating member; gearing operated by the actuating member and adapted to so correlate the time indicating members that they will indicate elapsed time in accordance with the position of the actuating member relatively to a predetermined zero point in its arc of travel; and a gage graduated in time periods, and adjustable relatively to the zero point, whereby the beginning time for any calculation may be made to correspond with the zero point and the calculation made by moving the actuating member to a position determined by the ending time as denoted by the gage.

2. The combination, in a calculating machine, of time indicating members; an axially mounted actuating member; gearing operated by the actuating member and adapted to so correlate the time indicating members that they will indicate elapsed time in accordance with the position of the actuating member relatively to a predetermined zero point in its arc of travel; and an arc shaped gage graduated in time periods, and adjustable relatively to the zero point, whereby the beginning time for any calculation may be made to correspond with the zero point and the calculation made by mov-

ing the actuating member to a position determined by the ending time as denoted by the gage.

3. The combination, in a calculating machine, of a member carrying a series of characters denoting selected multiplicands and a series of columns of characters, the characters in each column denoting multiples of one of the selected multiplicands; a member carrying a series of characters denoting multipliers; one of said members being movable relatively to the other; means for actuating the movable member to bring any column of multiples into juxtaposition with the multiplier series; an indicating member movable relatively to the multiplier and multiple series; a gage plate graduated to correspond with the multiplier series; an actuating member; gearing connecting the actuating member and the indicating member and adapted to position the indicating member to indicate a multiplier and the corresponding multiple of the selected multiplicand, the graduation of the scale on the gage plate being such that movement of the actuating member one step relatively to the scale moves the indicating member one step relative to the multiplier and multiple series.

4. The combination, in a calculating machine of a member carrying a series of characters denoting selected multiplicands and a series of columns of characters, the characters in each column denoting multiples of one of the selected multiplicands; a member carrying a series of characters denoting multipliers, one of said members being movable relatively to the other; means for actuating the movable member to bring any column of multiples into juxtaposition with the multiplier series; an indicating member movable relatively to the multiplier and multiple series; an arc shaped gage plate graduated to correspond with the multiplier series; an axially mounted actuating member; gearing connecting the actuating member and the indicating member and adapted to position the indicating member to indicate a multiplier and the corresponding multiple of the selected multiplicand, the graduation of the scale on the gage plate being such that movement of the actuating member one step relatively to the scale moves the indicating member one step relatively to the multiplier and multiple series.

5. The combination, in a calculating machine of a belt mounted to travel transversely of the casing and carrying a series of characters denoting wage rates or multiplicands, and a series of columns of characters, the characters in each column denoting multiples of one of the wage rates or multiplicands; a fixed plate carrying a series of characters denoting time or multipliers; means for actuating the belt to bring any column of multiples into juxtaposition with



the multiplier series; a gage plate graduated to correspond with the multiplier series; a hand lever movable relatively to the gage plate; a belt mounted to travel longitudinally of the casing over the fixed plate, and provided with a slit or slits adapted to disclose a multiplier and the corresponding multiple; and gearing adapted to drive the belt and adapted to be actuated by the hand lever.

6. The combination, in a calculating machine, of a member carrying a series of characters, denoting selected multiplicands, and a series of columns of characters, the characters in each column denoting multiples of one of the selected multiplicands; a member carrying a series of characters denoting multipliers, one of said members being movable relatively to the other; means for bringing any multiple series into juxtaposition with the multiplier series; selecting mechanism movable relatively to the multiplier and multiple series; means for actuating the selecting mechanism; and a movable gage plate mounted in juxtaposition to the actuating member and graduated to correspond with the multiplier series, the graduation being such that movement of the actuating member one step relatively to the scale moves the selecting mechanism one step relatively to the multiplier and multiple series.

7. The combination, in a calculating machine, of a member carrying a series of characters denoting selected multiplicands, and a series of columns of characters, the characters in each column denoting multiples of one of the selected multiplicands; a member carrying a series of characters denoting multipliers, one of said members being movable relatively to the other; means for bringing any multiple series into juxtaposition with

the multiplier series; selecting mechanism movable relatively to the multiplier and multiple series; an axially mounted member connected with and adapted to actuate the selecting mechanism to bring it into alignment with any multiplier and the corresponding multiple; and an arc shaped gage plate mounted in juxtaposition to the actuating member, movable relatively thereto, and graduated to correspond with the multiplier series, the graduation being such that movement of the actuating member one step relatively to the scale moves the selecting mechanism one step relatively to the multiplier and multiple series.

8. The combination, in a calculating machine of a belt mounted to travel transversely of the casing and carrying a series of characters denoting wage rates or multiplicands, and a series of columns of characters, the characters in each column denoting multiples of one of the wage rates or multiplicands; a fixed plate carrying a series of characters denoting time or multipliers; means for actuating the belt to bring any column of multiples into juxtaposition with the multiplier series; a movable gage plate graduated to correspond with the multiplier series; a hand lever movable relatively to the gage plate; a belt mounted to travel longitudinally of the casing over the fixed plate, and provided with a slit or slits adapted to disclose a multiplier and the corresponding multiple; and gearing adapted to drive the belt and adapted to be actuated by the hand lever.

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Witnesses:

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