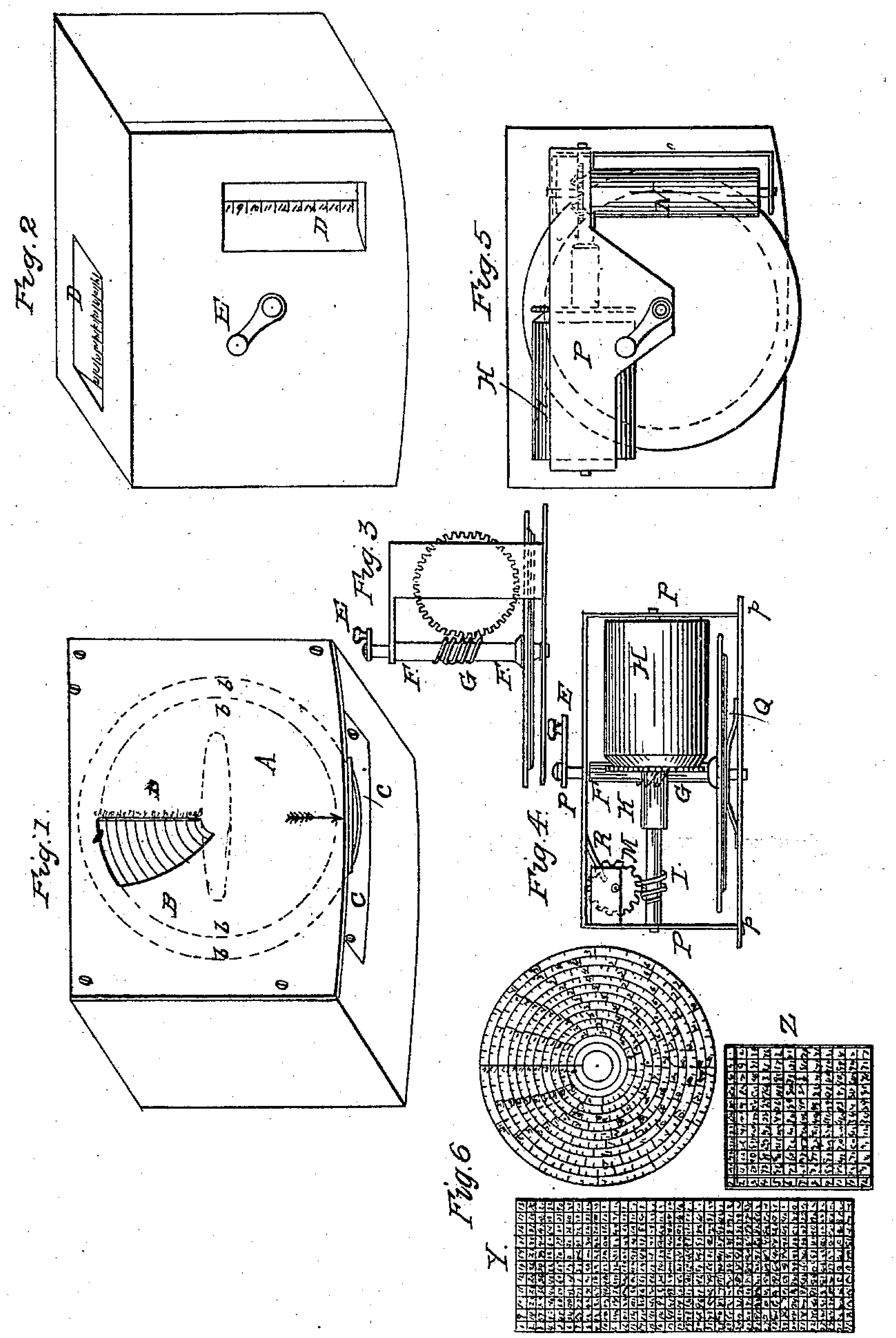
C. ROSS.

Measuring Machine.

No. 3,590. Patented May 17, 1844.



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UNITED STATES PATENT OFFICE.

CHARLES ROSS, OF PIQUA, OHIO.

RULE OR MEASURE FOR BOARDS, LEATHER, &c.

Specification of Letters Patent No. 3,590, dated May 17, 1844.

To all whom it may concern:

Be it known that I, CHARLES ROSS, of Piqua, in the county of Miami and State of Ohio, have invented a new and useful Machine for the Measurement of Boards, Plank, and other Lumber, called a "Revolving Board-Rule;" and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings and tables, making a part of this specification, in which—

Figure 1 is an outside view of the front and bottom, and Fig. 2 an outside view of the back and top.

A in Fig. 1, represents the brass front, fastened to the frame of the machine, by screws.

B in the same figure, represents an aperture, through which appears a revolving brass milled circle, called a traverse wheel, whose circumference is designated by the dotted lines *b* and which protrudes at C, through an opening in the brass piece *c*, inserted in the bottom of the machine. On the surface of this brass wheel is a smaller thin wooden circle, fastened to the brass wheel, by rivets, on which is pasted the engraved table X, which is, a representation of the common board rule in a circular form. The outer circle of the table is divided into 12 inches and their parts, so that one revolution of this wheel, measures one linear foot.

D in the same figure, is a graduated index two others, similar to which, appear in Fig. 2, containing figures denoting the length of the surfaces whose contents are to be calculated.

E which appears in Figs. 2, 3, 4 and 5 is a crank which turns a metal shaft F, (which is 2 inches between its bearings) in Figs. 3 and 4. At the other end of this shaft is the traverse wheel.

G represents an endless left handed screw cut midway between the ends of the shaft and upon it, which works a vertical brass cog-wheel, $1\frac{3}{8}$ inches in diameter, fastened to which, by a horizontal shaft K, is a wooden cylinder H, whose diameter is $1\frac{1}{2}$ inches which revolves with it, and is visible, in the machine through an aperture at the top. See Fig. 2. On this shaft K, which is $4\frac{1}{4}$ inches between its bearings, and near its left end, is cut another right handed endless screw L, similar to the one at G, which turns the cog wheel M, which together with the vertical wooden cylinder N, ($\frac{3}{4}$ of an inch in diameter) revolves, in a brass strap O fastened to the frame P by means of rivets. This cylinder appears in the machine through the lower aperture in Fig. 2, and its shaft measures $2\frac{3}{4}$ inches between its bearings.

P is a brass frame, fastened to the front piece at *p*, made of one entire piece of metal and the back part of which appears at P in Fig. 5.

Q is a friction spring, fixed between the brass front and the traverse wheel, which are $\frac{1}{8}$ of an inch apart, to prevent the brass wheel from moving too freely and to give it steadiness.

R is a reporting spring, which marks the end of every revolution of the cylinder N.

On the cylinder H is pasted the engraved table Y and on the cylinder N, the table Z. Before these are pasted on, the 12 inch mark on the table of the traverse wheel must be brought under the edge of the index, and in this position, a line drawn on each cylinder, under the edge of its index, will be the commencing point for the tables.

The machine may be employed for calculating any superficial measure. To set it for use, the traverse wheel, must be turned by means of the crank until the black line passing from the center of the wheel to the 12 inch mark on the circumference, coincides with the edge of the brass index and the line immediately under the row of figures on each cylinder commencing with the highest figure, in the left hand column, coincides with the edge of its index. It must be held in the right hand, with the brass front toward you, placing that part of the traverse wheel, immediately under the head of the arrow (in Fig. 1,) upon the point of commencement. The instrument must then be pushed in a straight line in the direction to be measured, over the surface. Each revolution of the traverse wheel, measures one linear foot, which is registered on the cylinder H by the turning up of the first row of figures. The left hand row of figures in table Y on cylinder H counts the number of revolutions made by the traverse wheel, up to 36, when the cylinder itself has made one complete revolution. This revolution of the cylinder H is then registered by the table on cylinder N, which has turned so as to show the row of figures commencing with 1, and when the cylinder H has revolved 12 times, the cylinder N has revolved once. One revolution of the traverse wheel measures 1 foot, one revolution of the cylinder H, 36 feet, and one revolution of the cylinder N, a distance equal to 12 times 36 feet or 432 feet. If in crossing a surface, the cylinder N has revolved once entirely, the cylinder H shows in the left hand column, the figure 18, and the undex on the brass front covers the line marked by the Fig. 11, on the outer circle of the traverse wheel, we may know, that the rule has measured, a distance of 450 feet and 11 inches. One revolution of cylinder N, 432 feet; one half revolution of cylinder H, 18 feet; 11 inches on traverse wheel, 11 inches; total 450 feet, 11 inches. This is its method of linear measurement.

To calculate any sperficial measurement it is necessary first to measure the length of the surface, in the above manner. Then the wheel cylinders must be adjusted as has been shown, at the beginning of the tables. Then the width of the surface must be measured in the same manner and that figure, in the uppermost row on the cylinder, opposite the figure on the index which denotes the length of the surface, will be its superficial content. Thus if a surface 17 feet long, should measure 36 in width, that figure in the row beginning with 36, (which would be the uppermost row), opposite to the figure 17, (the length) in the index, would be its superficial measurement, viz., 612 square feet.

It will be perceived that the index to cylinder H contains no figures between 1 and 9 or over 18. In order to measure the superficies of a surface, whose length is greater than 18 feet, it would only be necessary to divide its length into two factors, one of which should be between 9 and 18 feet and taking that for the length and measuring the corresponding superficial area, to multiply the quantity found, by the remaining factor. Thus the superficial measurement of a surface 35 feet wide by 20 long, would be twice the superficial area of one, 35 feet wide by 10 long, viz., $2\times350=700$ feet.

When the widths amount to more than 36 feet, the areas are to be found in the table on the cylinder N. Thus suppose boards of 14 feet length are measured to 72 feet wide. In going over 36 feet the cylinder H makes one revolution and in going over 72 feet, of course, just makes two. Now as each revolution of the cylinder H is registered in the table on cylinder N its second revolution will exhibit on cylinder N the row of figures commencing with 2, and the figure in that row, corresponding to the figure 14 on the index, viz, 1008, will be the contents of the superficies.

A compound calculation by the use of both cylinders may be illustrated in this way. In measuring plank 12 feet long, their widths amount to 89 feet. In measuring this 89 feet, the cylinder H makes two entire revolutions at the end of 72 feet which are marked by the turning up of the second row of figures on cylinder N, and a part of another revolution, turning up its 17th row of figures.

The area of 72 ft. by 12, shown on cylinder N is 864 feet; the area of 17 feet by 12, shown on cylinder H is 204 feet; making a total of 1,068 sq. feet.

This operation might be made still more complex, by supposing the widths to have been 89 feet and 11 inches, the length being 12 feet. The contents of 72 ft. by 12, on cylinder N, would be 864 feet; the contents of 17 ft. by 12, on cylinder H, would be 204 feet; total, 1,068 sq. feet. Now in going 11 inches further, the traverse wheel would not have made one entire revolution, but the edge of the index would have been at the figure 11 of the outer circle. Now the figure in the table on the wheel, corresponding to the figure 12, on the index representing the length, denotes the product of 11 inches by 12 feet, viz., 11 feet, which being added to the above makes 1,079 sq. feet.

Each one of the circles on the table X on the traverse wheel, is divided into as many feet and parts of feet, as there are feet in two lengths of the surface to be measured, denoted by the corresponding figures on the brass index. Thus in a surface 1 foot long, there are 12 parts, marked on the outer circle; in a surface 18 feet long there are 18 parts with their subdivisions, marked on the circle corresponding to the figure 18 on the index, the outer circle being in inches, the rest in feet. This table is used entirely for calculating the superficial contents of surfaces whose widths are feet and inches or inches only. Thus the area of a surface 18 feet long and 10 inches wide is found by turning the traverse wheel, till the 10 inch mark coincides with the edge of the index and the figure (15) immediately opposite the figure denoting the length, (18) expresses the number of square feet in the surface. So the number of square feet in a board 15 feet long and 10 inches wide is 12½.

It may sometimes be desirable to measure surfaces whose length may be less than 9 feet. In order to do this, I propose constructing a machine exactly on this principle, leaving out the cylinder N, and adding another cylinder, similar to H, on the left of the cog wheel in Fig. 4, but on the same shaft, K, and extending the aperture on the top, farther to the right in Fig. 2. On this will be pasted a table, precisely similar to Y, except that it will contain columns for the figures from 1 to 9 and their multiples, so that the cylinder H will commence its calculation when the other ceases.

When the measurement is fractional both ways the calculation may be made by adding the inches of one part to those of the other and counting as if this had been the actual measurement. Thus suppose that, on trial, a surface should be found to be 17 feet 5 inches in length and 35 ft. 6 inches in width. By looking on the cylinder H, along the 35th row at the figure 17 on the index, we find the contents of a surface 35 ft. wide and 17 ft. long to be 595 sq. feet, and adding the 5 inches to the 6 and turning on the traverse wheel, to the 11 inch mark, we find at the figure 17 on the index the square feet in a surface 17 feet long and 11 inches wide to be 15 ft. 7 inches, making the whole 610 ft. 7 inches.

What I claim as my invention and desire to secure by Letters Patent is—

The combination of the common board rule with the self calculating cylinders, and their combined application to the measurement of plane surfaces in general, but more particularly to the measurement of the superficial contents of boards, plank and lumber.

CHARLES ROSS.

Witnesses:
THOS. S. MATTHEW,
WARNER SPENCER.