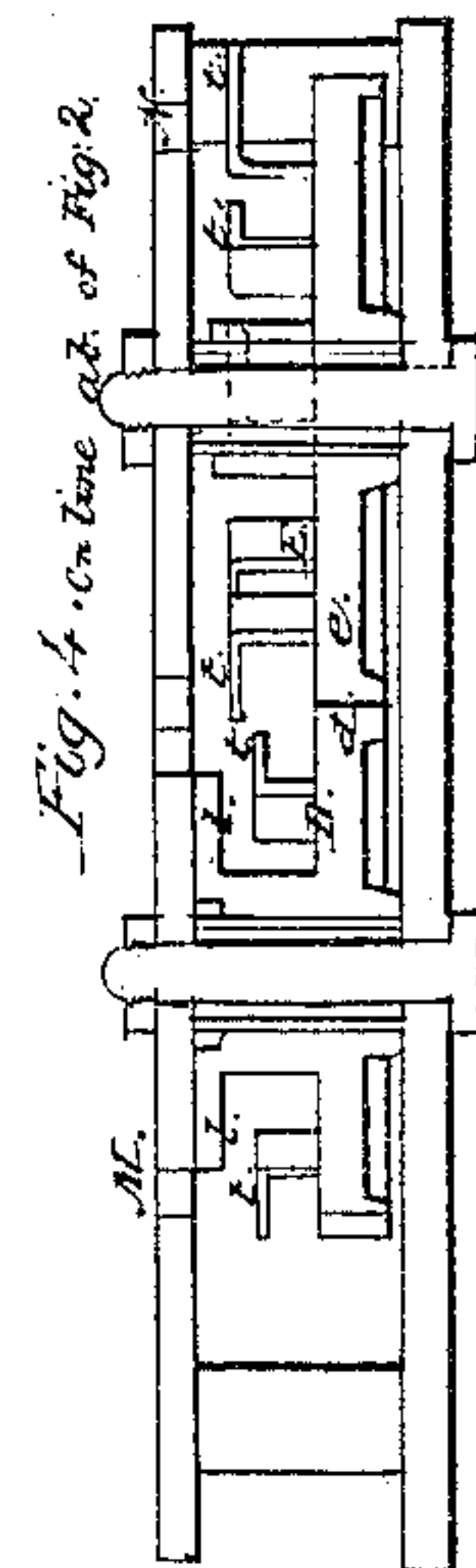
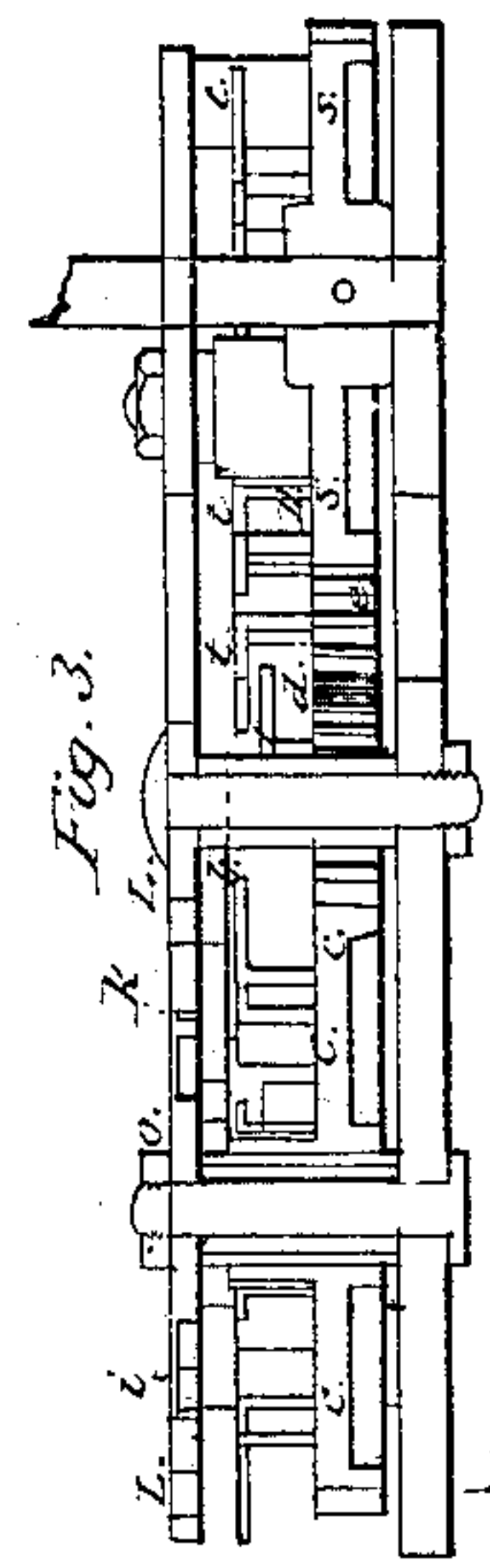
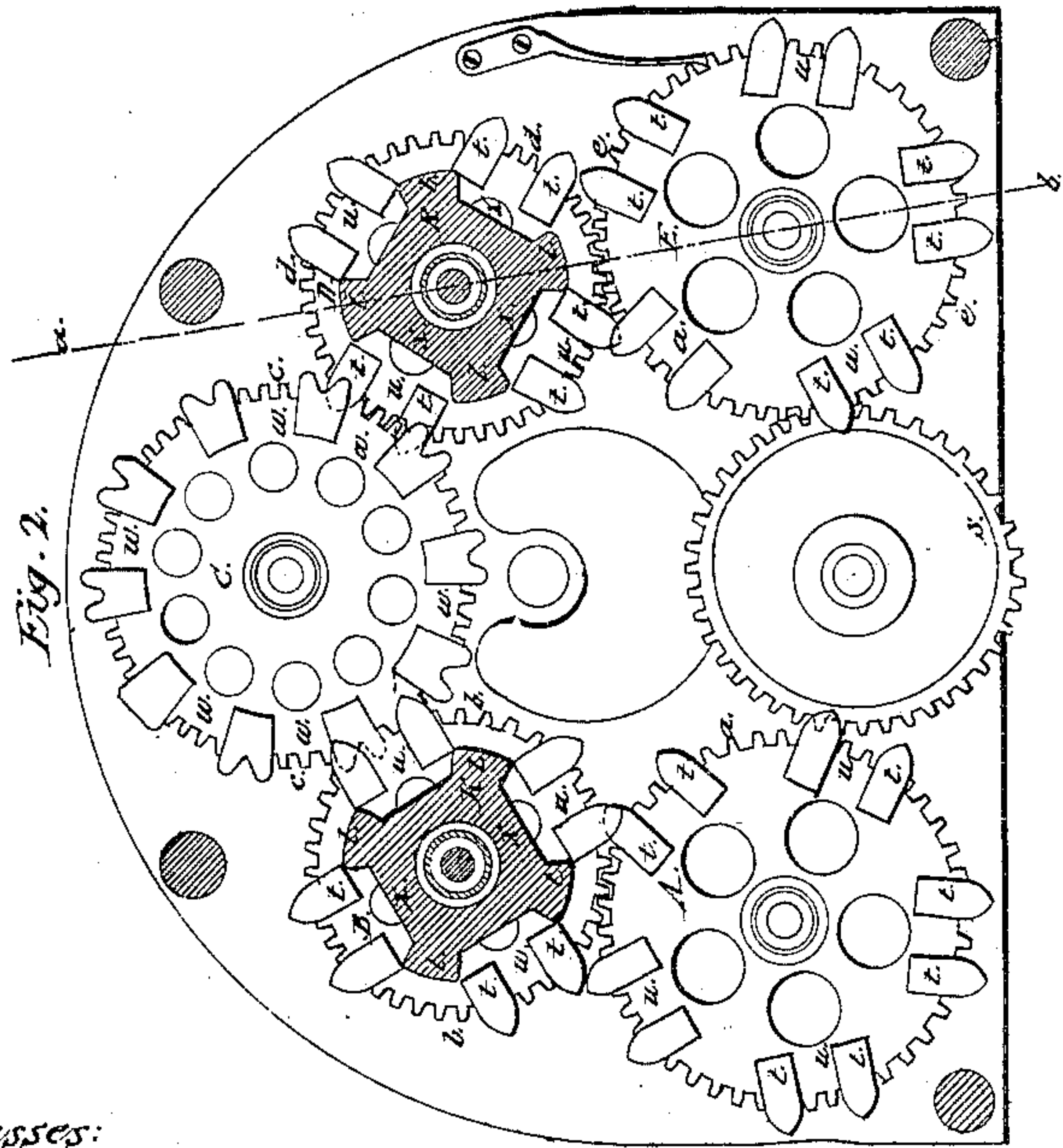
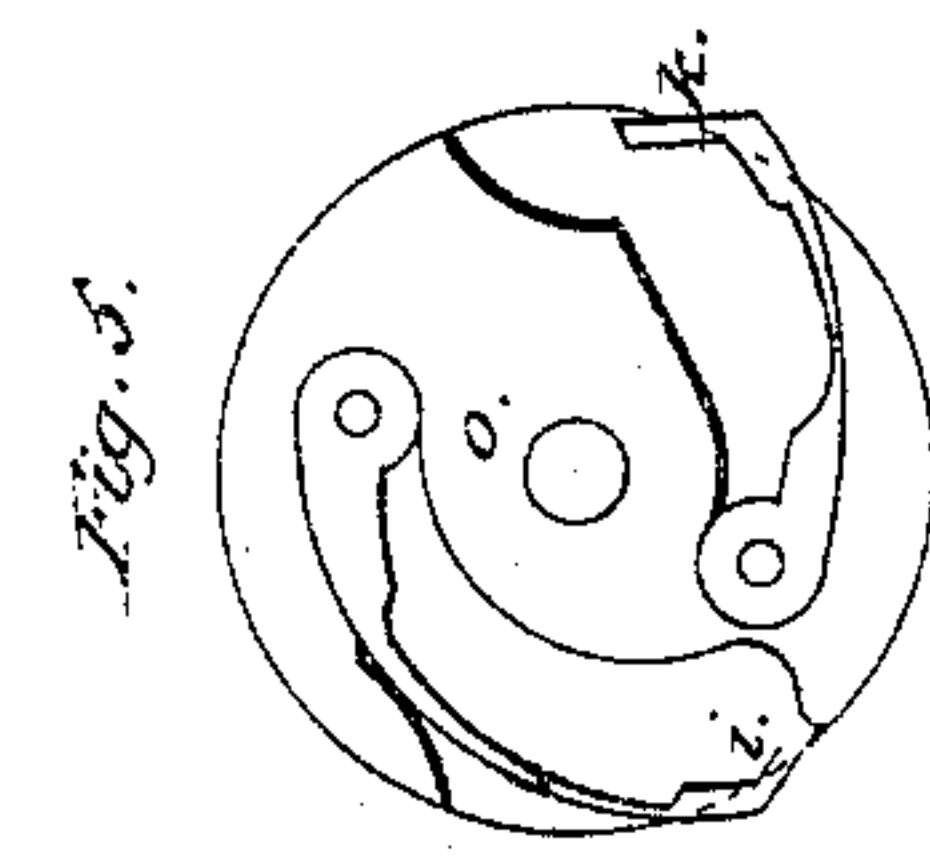
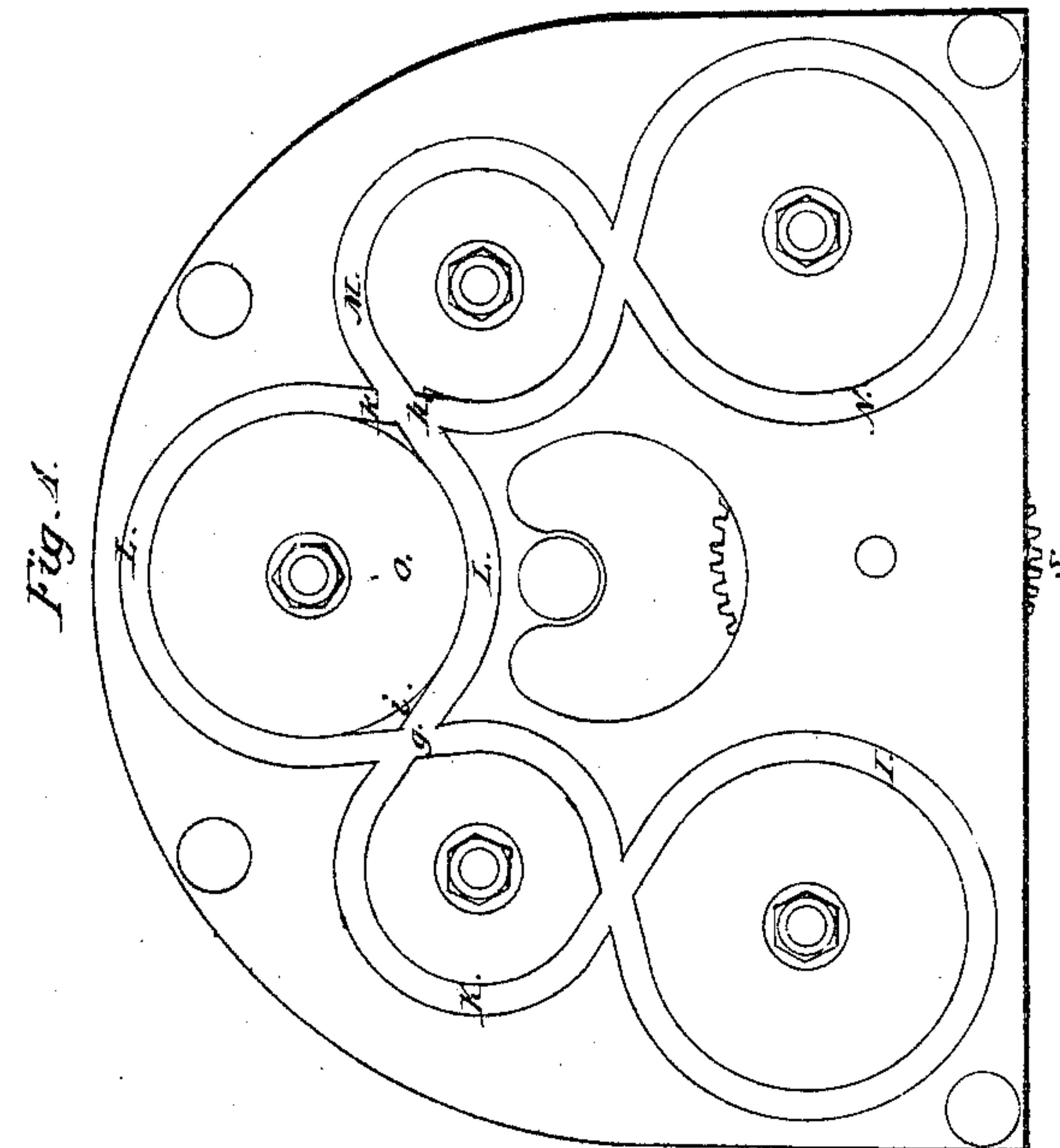


L. Hull. Braiding Mach.

Nº 58,830.

Patented Oct. 16, 1866.



Witnesses:
Frederick Curtis
G. H. Washburn

Liverus Hull
by his attorney
R. H. Cady

UNITED STATES PATENT OFFICE.

LIVERAS HULL, OF CHARLESTOWN, MASSACHUSETTS.

IMPROVEMENT IN BRAIDING-MACHINES.

Specification forming part of Letters Patent No. 58,830, dated October 16, 1866.

To all whom it may concern:

Be it known that I, LIVERAS HULL, of Charlestown, in the county of Middlesex and State of Massachusetts, have invented a new and useful Braiding-Machine; and do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a top view of it; Fig. 2, a horizontal section taken immediately below its race-plate. Fig. 3 is a longitudinal and central section of it. Fig. 4 is a vertical section taken through two of the race-circles and the mechanism beneath them. Fig. 5 is an under-side view of the plate O and its spring-cams, hereinafter described.

The purpose of the machine hereinafter described is to fabricate two or more distinct braids and connect them together at their edges in the process of making them, in order that when completed they shall be in the form of one braid of a width equal to their united widths.

With my invention the braids may be of the same or different colors in their threads, and thus I am enabled to form braided goods, such as webbing, bands, or belts, with stripes of two or more different colors.

The drawings illustrate a machine for making two braids of different colors and conjoining them at one edge of each, the threads of one being interbraided or interlaced with those of the other at their edges to be connected. To accomplish this I make one race-circle of the machine a common terminal circle of two series of race-circles for the formation of the two braids.

In braiding-machines each terminal carrier has one horn more than that next to it—that is to say, that while the terminal carrier has five horns the next adjacent carrier will have four horns. The two external terminal carriers, A and E, of my new machine have five horns each, and the two next carriers, B D, have only four horns to each of them; but the middle carrier, C, or that which is common to the two, I construct with ten horns, and of sufficient size therefor. Each horn of each of the carriers, except the middle one, C, is recessed or formed of two teeth or projections, *t t*, extending up from the gear-wheel *a b d e* making part of such carrier. It is into this

recess (shown at *u*) that the driving-projection of the racer extends. The horns of the middle carrier, C, are, however, composed of only one projection, the spaces between them being so arranged that they may co-operate with the recesses *u* of the pairs of projections *t t*.

The driving-gears *a c e* of the three terminal carriers are each of one size—that is, their diameters are equal, and each gear has the same number of cogs or teeth. Thus, the carrier C will revolve in the same time with either of the other terminal carriers, A E. Consequently, each of the smaller carriers, B D, will operate with every other one of the spaces *w* between the horns of the middle or common terminal carrier, C—that is to say, while the first, third, fifth, seventh, and ninth of such spaces will operate with one carrier, B, the second, fourth, sixth, eighth, and tenth spaces will operate with the carrier D.

With such a construction and arrangement of the carriers and their race-circles, and with proper means of deflecting the racers from one race-circle of their course into another as occasion may require, I am enabled to effect the manufacture of two distinct braids of different colors, and to connect them at one edge of each, so as to form a parti-colored braid or webbing.

The racers of the two series, in going through the middle race-circle, will intertwine or bind together certain of their threads, whereby the two distinct braids will be united at their adjacent edges.

In the drawings, the two external terminal race-circles are shown at I N, and the common terminal race-circle is exhibited at L. The other two race-circles are shown at K M. The middle circle, L, opens into each of the circles K M, in manner as shown at *g* and *h*.

There are affixed to the under side of the plate O of the common terminal circle two springs or spring-cams, *i k*, (see Fig. 1,) which operate at proper times as guides to direct or turn the racers out of the middle terminal race-circle and into either of the next race-circles.

A recessed and cammed plate, R, formed as shown in Fig. 2, is affixed to each of the carriers B D, the office of the cams or projections *l l l l* of such plate R being to prevent the racers from running out of the middle race-circle when they should pass by an opening

leading out of it. The recesses x in the plate also serve to steady and direct the racers as they pass into the lesser race-circles.

A gear, S, is made to engage with one of the gears of the carrier-train, so as to put the said train in movement. In other respects, the braiding-machine is to be constructed and supplied with racers and their necessary appliances in the manner common to other braiding-machines in ordinary use.

It is no difficult matter to make a braid of any width by a common braiding-machine properly constructed therefor; but in this case, were threads of different colors used in the racers, the braid formed would not have regular stripes of color, as each color in the process of braiding would be carried entirely across the braid from edge to edge, for each racer would have to travel throughout the entire course of race-circles; but with my improved machine each racer goes only through its own course of race-circles, one of which circles is common to the two carriers. Thus, the two colors or threads of two colors can only intertwine while the racers are passing through the terminal race-circle common to the two carriers. Therefore, that principle by which my invention or braiding-machine is distinguished from others consists in its having one terminal carrier and its race-circle or groove, or the mechanical equivalents therefor, common to or constituent parts of two ordinary mechanisms for making a braid, the same being so constructed as while making both braids to cause threads for each to be so intertwined as to connect the two braids at one edge of each in a manner to form of them a single braid, which, when the threads of the racers of one mechanism may differ in color from those of the racers of the other mechanism, will have two distinct stripes running lengthwise of it.

It will be evident that by so combining several mechanisms for making braids that a carrier and its race-circle shall be placed between the first and second, and the second and third, the third and fourth of them, and so on, and be constituents of each next adjacent pair of mechanisms, in manner as hereinbefore described, we can make with such a braid of several different stripes running lengthwise of it.

In my improved machine the racers are driven by carriers, each of which forms no part of a race-circle; and I do not employ tri-armed tappets to be moved by the revolving head and the racer, and which are liable to derangement or not to operate correctly, and require the machine to be run at a very slow speed in comparison to that at which my machine can be operated with certainty of correct action, and without danger of derangement of the racers.

I do not claim two braiding mechanisms so arranged that one terminal carrier shall be common to each of them, as hereinbefore described; nor do I claim in such a machine the employment of recessed rotary heads to form the inner boundaries of the race-courses or race-circles, and to remove the racers through such circles.

I claim—

My improved compound braiding-machine, constructed in manner and so as to operate as described—viz., as composed of the carriers A B C D E and their gears, the race-circles I K L M N, the spring-cams $i k$, and the recessed and cammed plates R R, the whole being arranged as set forth.

LIVERAS HULL.

Witnesses:

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F. P. HALE, Jr.