

E. M. Ray.

Circular Knitting Mach.

Nº 10,993.

Patented May 30, 1854

Fig. 1.

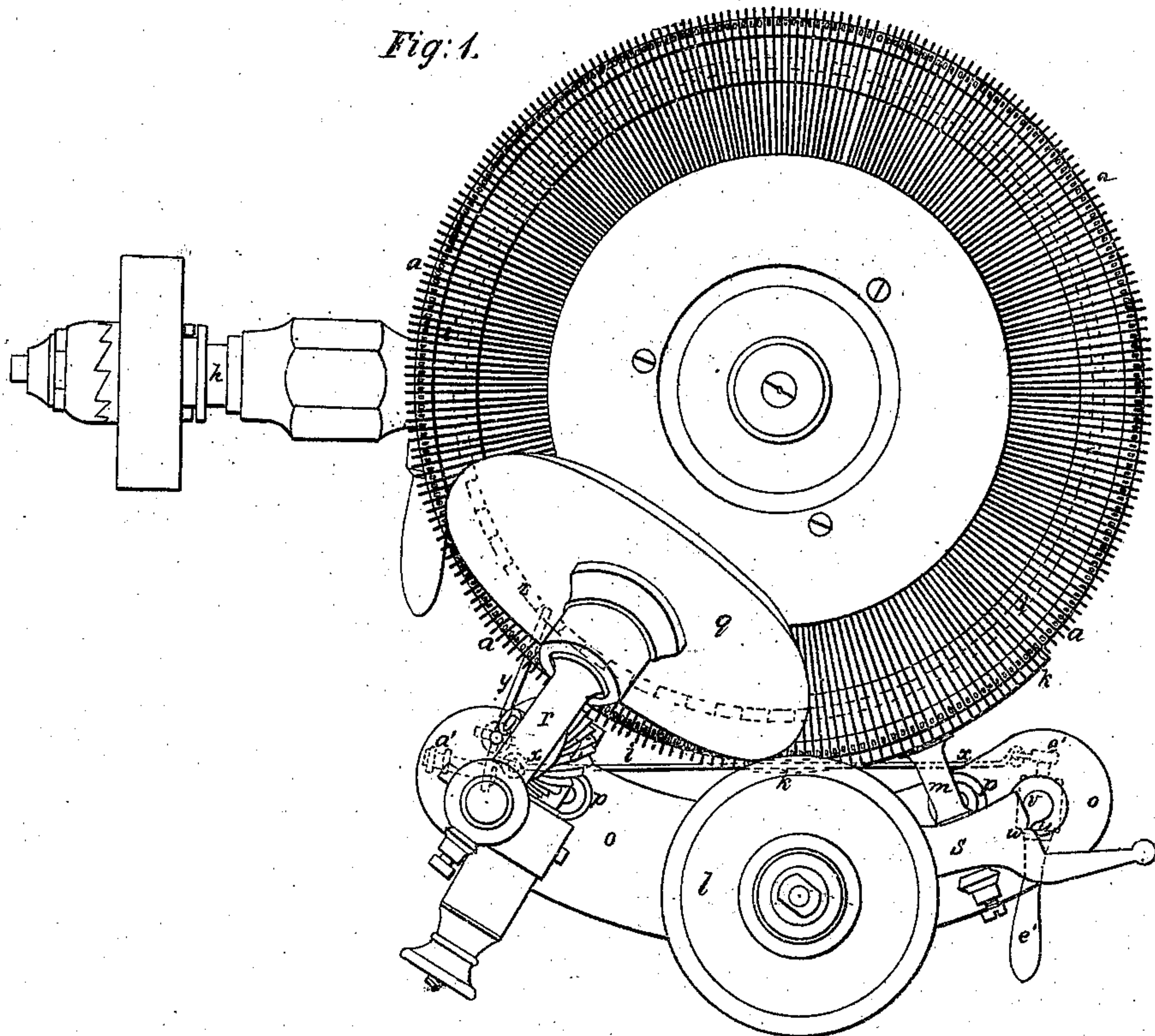
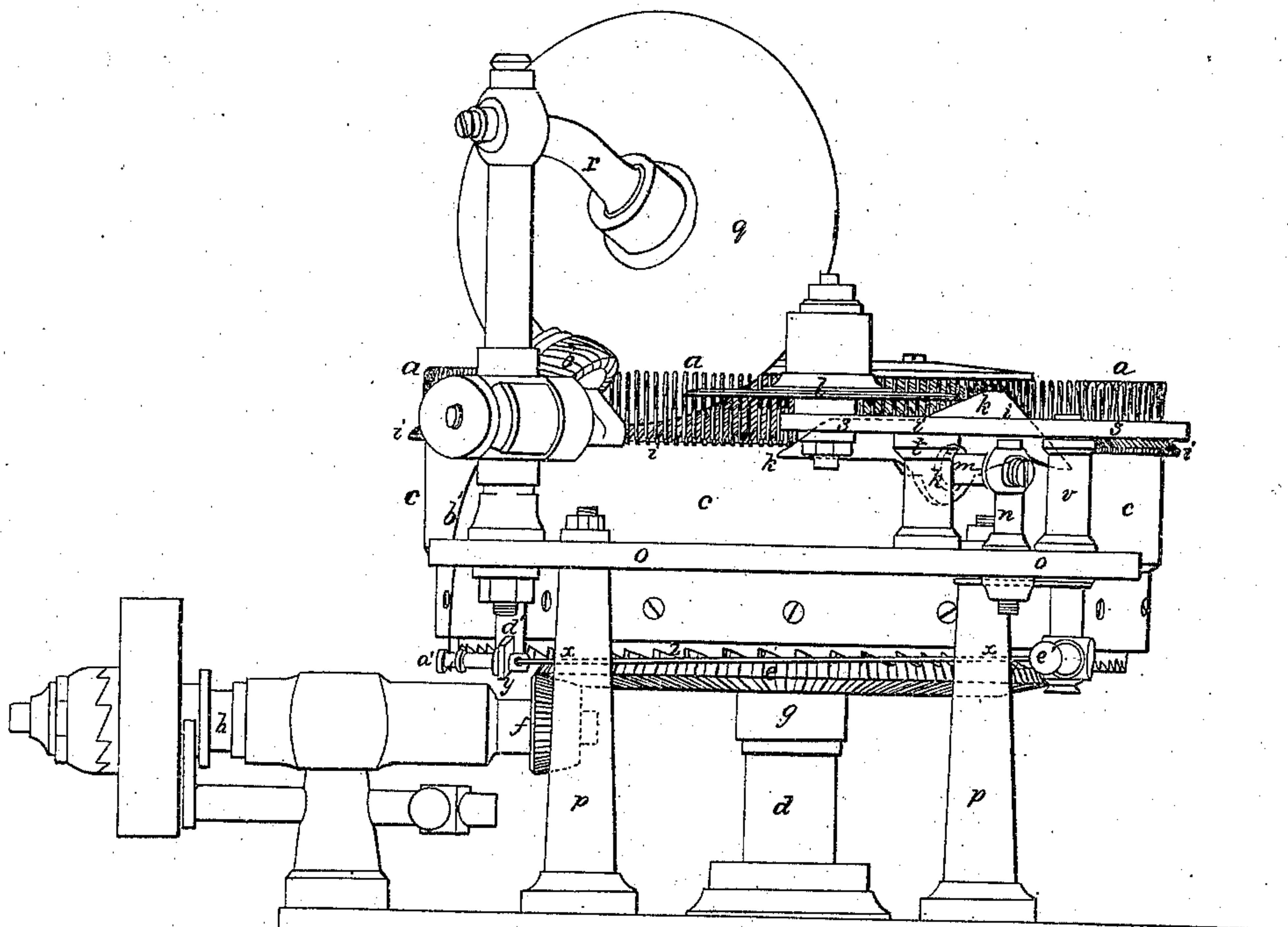


Fig. 2.



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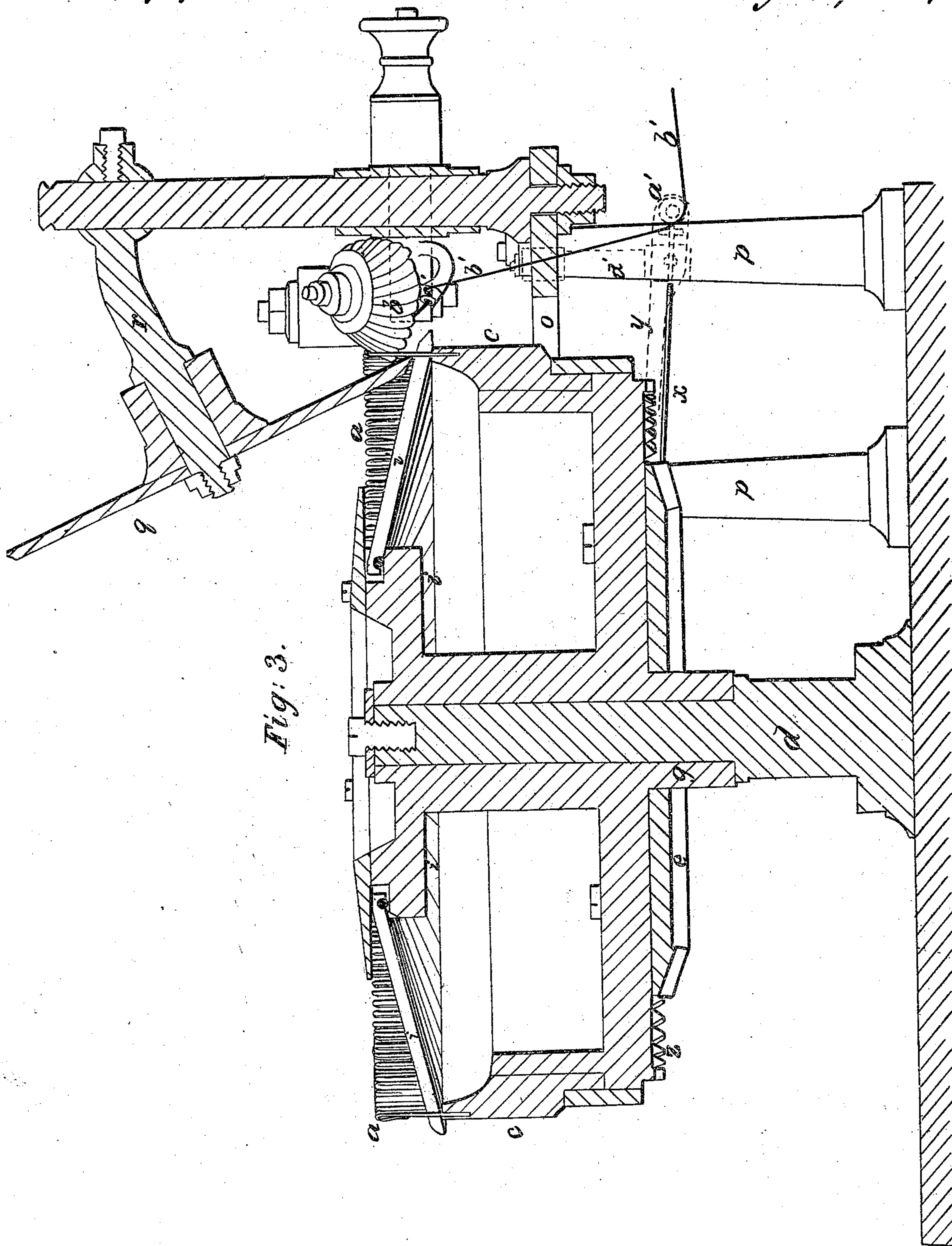


Fig. 3.

UNITED STATES PATENT OFFICE.

ELIAS M. RAY, OF PROVIDENCE, RHODE ISLAND.

KNITTING-MACHINE.

Specification of Letters Patent No. 10,993, dated May 30, 1854.

To all whom it may concern:

Be it known that I, ELIAS M. RAY, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in the Rotary French Knitting-Machine; and I do hereby declare that the same are fully described and represented in the following specification and the accompanying drawings, letters, figures, and references thereof.

In the said drawings, Figure 1, represents a top view of my said improved knitting machine. Fig. 2, is a front elevation of it. Fig. 3, is a central, vertical and transverse section of it.

The machine improved by me is known generally, by the name of the French circular rotary knitting machine, in which there is not only a row of upright needles, *a, a, a*, arranged in a circle and each made to stand vertically, but a toothed sinker wheel *b*, to run between the needles and form the loops. The said row of needles is attached to a rotary frame, *c*, that is made to rotate horizontally over or above a stand or base, *d*, and is rotated by bevel gears, *e, f*, one of which, viz., *e*, is arranged on the bottom of the rotary frame or its shaft, *g*, while the other, *f*, is fixed on a driving shaft, *h*.

The first portion of my invention of improvement consists in having a series of wires or lifters, *i, i, i*, arranged horizontally and radially as seen in the drawings (and made to extend between the needles) there being one of such lifters between every two needles and made to project beyond their outer surfaces a short distance. At its inner end each lifter bar is so applied to the rotary frame, *c*, as not only to hold the lifter bar in place, but to allow the front end of said lifter bar to be raised upward. Under the projecting part of the wires or lifters, there is a stationary lifting cam, *k*, which at the time it is required to cast the stitches over the loops, lifts such of the wires or lifters as may be necessary and thereby elevates the stitches on the needles and throws them over the loops which may be up under their barbs or hooks, and while the said barbs are pressed down against the shanks of their needles by the presser wheel, *l*. The said cam is fastened to an arm, *m*, extending horizontally from a vertical standard or post, *n*, that rises from a stationary curved bar, *o*, which is supported in position by two posts, *p, p*. I make

use of as many inclined lifter planes, or cams, *k*, as I employ bobbins or threads. That is to say, to each sinker or loop forming wheel and its presser I employ one of the lifter cams, and in order to keep the lifter bars properly down below the sinker wheel while they are passing around beneath it, I employ a rotary presser wheel, *q*, disposed within the range of needles as seen in the drawings, and made to freely rotate on the end of a stationary arm, *r*.

The presser wheel, *l*, is arranged on one end or arm of a horizontal lever, *s*, which turns horizontally on a fulcrum at the top of a post, *t*, so as to enable the presser to be moved toward or away from the barbs of the vertical needles. When the presser is held up or forced against the barbs, it is kept in such position by means of a small dog or catch, *u*, which is made to project from the upper end of an upright shaft, *v*, and to take into a notch, *w*, formed in the other arm of the lever *s*, the first mentioned arm being that on which the presser, *l*, is placed. This upright shaft has a small lever, *e'*, affixed horizontally to its lower end. To the inner arm a wire or rod, *x*, is jointed and made to extend to and be jointed at the outer end or arm of a small rocker lever, *y*, whose inner arm operates in connection with a series or circular row of cogs or teeth applied to the underside of the needle frame. The outer arm of the rocker lever, *y*, has a small shed or projection, *a*, extended from it. The thread, *b'*, in its passage from the bobbin is carried under and against this stud and thence to and up through a guide, *c'*, and thence between the sinker or loop forming wheel to the needle or work in the usual way. While the thread is being woven, or knit, its tension so acts on the rocker lever as to elevate its outer arm and thereby depress its longer arm below or out of the range of cogs or teeth, *z*. But should the thread become broken, the tension of the thread will be destroyed, so as to permit the outer arm of the rocker lever (which outer arm by the way, is made the heavier) to fall downward and thereby elevate its inner end into the range of teeth, which being in rotation will act against the said inner arm and move the lever horizontally, it being understood that the fulcrum post, *d'*, of the rocker lever is so applied to the curved bar, *o*, as to admit of such horizontal movement

of the rocker lever. Now when said rocker lever is so moved horizontally by the cogs or teeth, a draft will be created on the wire or rod, *x*, such as will move the lever, *e'*, so
5 as to cause the dog or catch, *u*, to be moved out of the notch, *w*, of the lever, *s*, whereby the presser wheel, *l*, will be set free and so as not to press upon the barbs of the needles. This does not stop the entire ma-
10 chine from operating, as the rotary set of needles, and the other threads (when more than one thread is used in the machine and machinery is employed in connection with the needles and to perform the operation of
15 knitting the same) still continue to operate the knitting of the broken thread being arrested until it is mended and the presser, *l*, again brought into operation on the barbs of the needles.

20 The common method of lifting the stitches and casting them over the loops in a machine of the above kind or description has been by a wheel formed like the loop sinker wheel and made to work in between the needles.
25 Now such a wheel as this is liable either to displace the needles or to seriously injure

them by continued operation between them, as it subjects them to more or less wear and to a friction which is very injurious to them. By means of the series of lifters, *i*, *i*, *i*, and
30 their lifting cam applied to the needles and operating in the manner as above described, the needles are not only kept in place, but they are not liable to the wear and injury
35 to which they would be subjected by a lifter wheel such as ordinarily used. Besides this, the elevation of the stitches and the casting of them over the loops is rendered certain.

What I claim as of my invention is

The combination of the series of radial
40 and horizontal lifter wires and the stationary lifter cam with the rotating set of needles the same being made to operate there-
with substantially as above set forth.

In testimony whereof I have hereunto set
45 my signature this fifth day of December A. D. 1853.

ELIAS M. RAY.

Witnesses:

EDWARD F. MILLER, Jr.,
THOMAS C. GREENE.