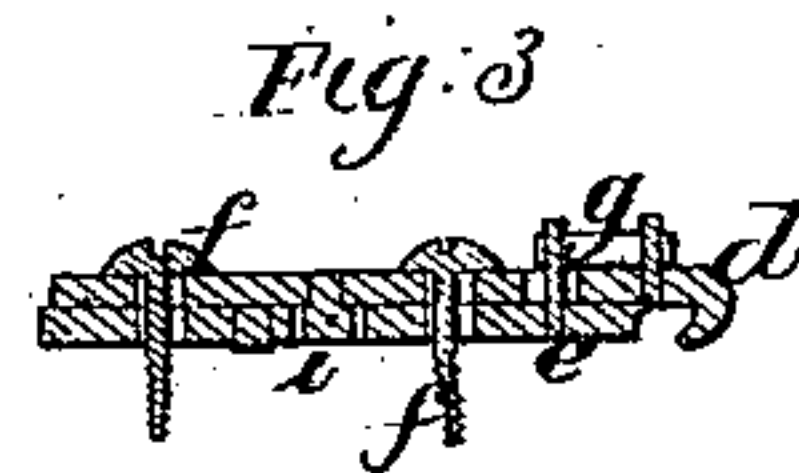
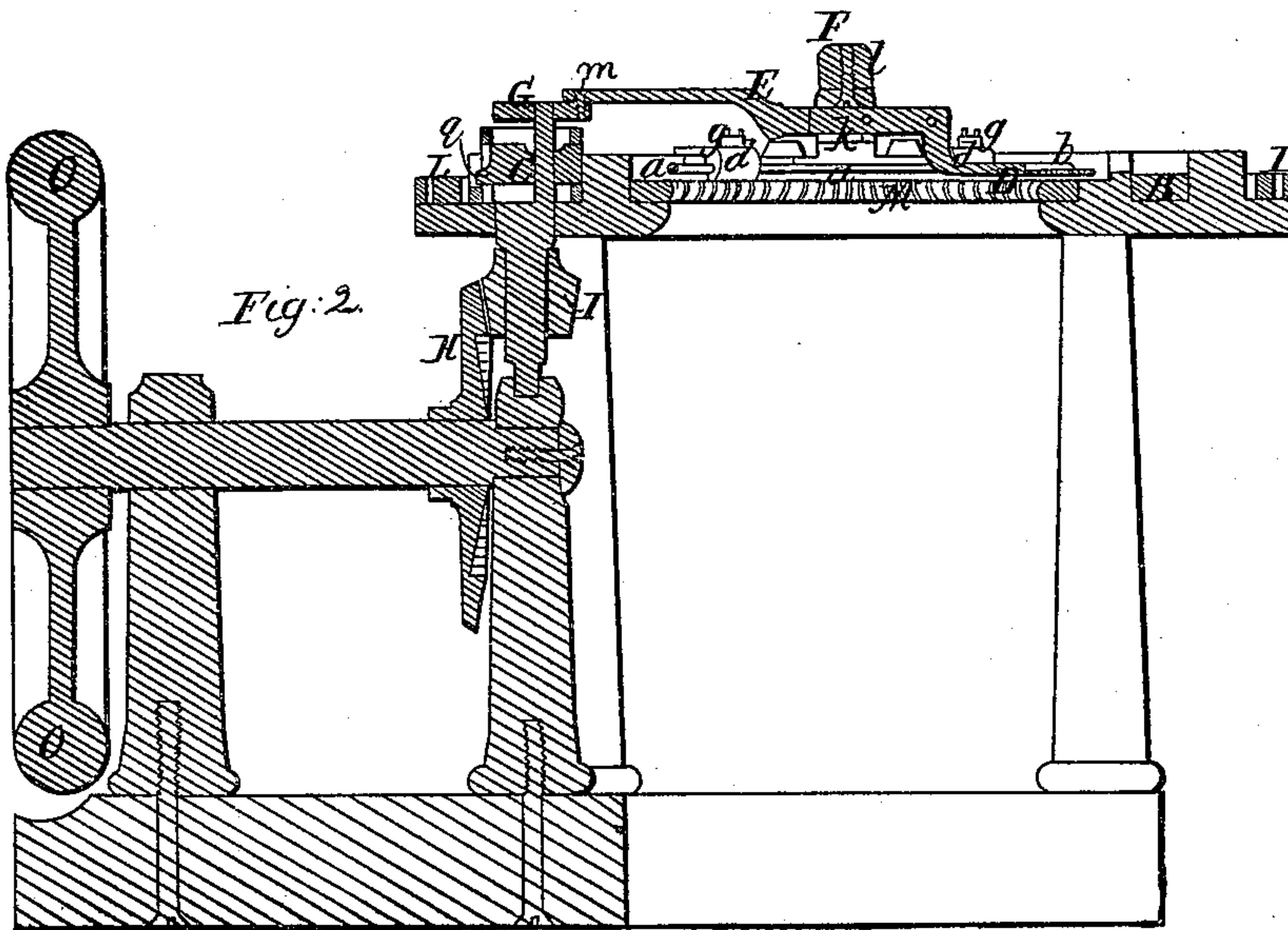
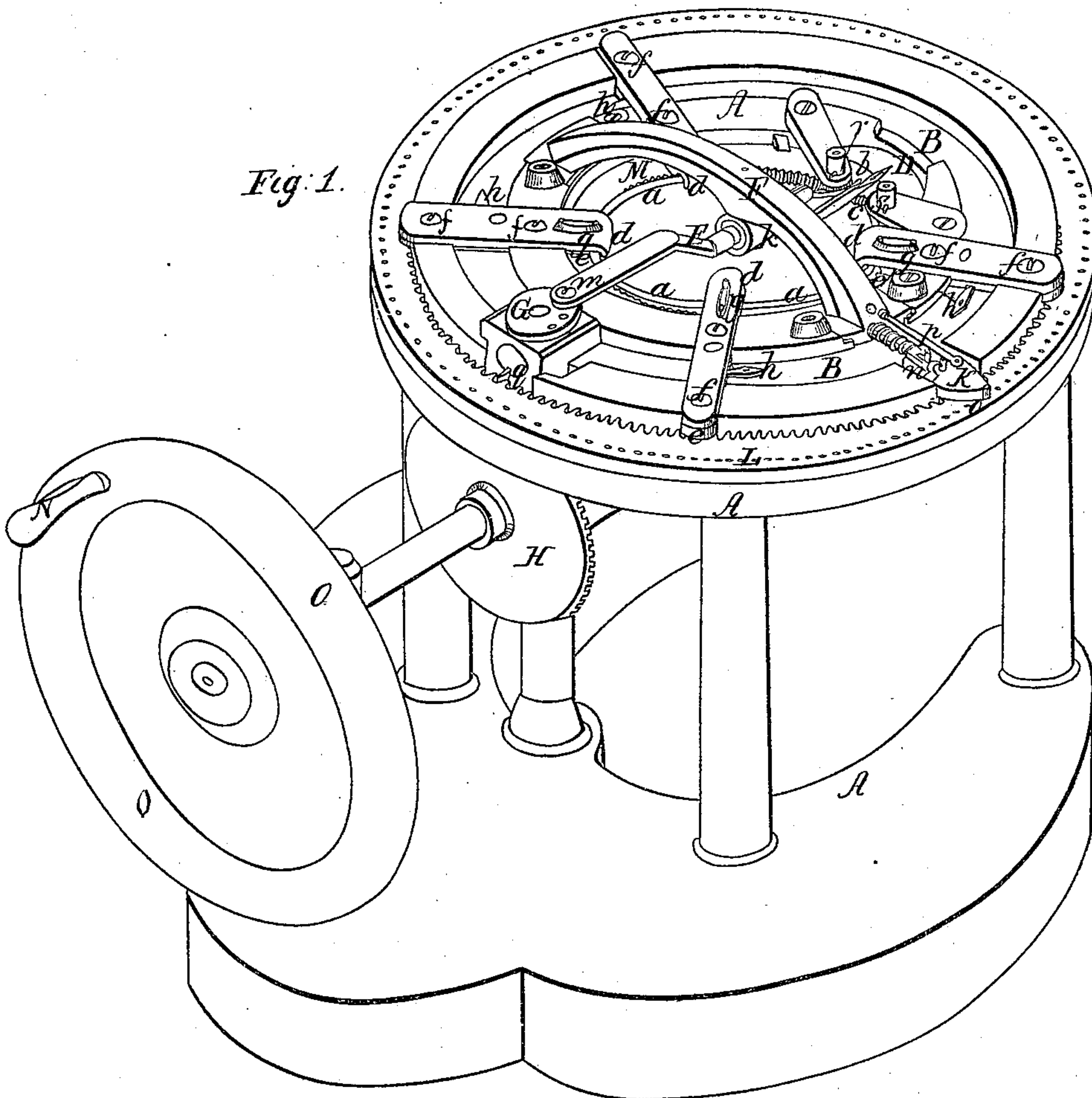


A. French.

Circular Knitting Mach.

N^o/3,750.

Patented Nov. 6, 1855.



UNITED STATES PATENT OFFICE.

A. FRENCH, OF WATERBURY, CONNECTICUT.

KNITTING-MACHINE.

Specification of Letters Patent No. 13,750, dated November 6, 1855.

To all whom it may concern:

Be it known that I, ARASMUS FRENCH, of the city of Waterbury, in the county of New Haven, State of Connecticut, have invented a new and useful Improvement in Knitting-Machines; and I do hereby declare that the following is a full, clear, and exact description of the construction, character, and operation of the same, reference being had to the accompanying drawings, which make a part of this specification, in which—

Figure 1 is a perspective view of the machine ready for use. Fig. 2 is a view of a section of the same, cut vertically through the center. Fig. 3 is a longitudinal section of one of the clamps, or hoop holders, *d, d, d, d*, Fig. 1.

My improvement consists in constructing the machine in a circular form, with an opening in the center, in which an open hoop, (onto which the stitches are looped,) is suspended, when it is sustained by clamps, or holders, in such a manner that two will sustain it at all times, and yet they will be so opened and closed, (by means of an eccentric and cams,) as to allow the loops, or stitches, to slide along to feed the work, and in the manner of taking the loop from one point of the hoop, and forming a new stitch on the other point, by the use of a needle with the eye near the point, (similar to those used in many sewing machines,) while the operation of the needle will feed the work, and the manner of causing the needle to take up two loops, (by the motion of the arch bar, which supports the needle in the center,) for the purpose of narrowing, and in so constructing it, that the needle will knit equally well either way, for any desired length of time, by simply reversing the motion of the crank, so that it is perfectly convenient for knitting heels of stocking.

I make the frame, *A, A, A*, of iron or any other suitable material, substantially in the shape, or form, represented in Fig. 1.

I make the open hoop, *a, a*, Figs. 1, and 2, of round wire, in the shape of a circle, except where it is open, where I bend the ends outward, substantially in the shape shown at *b*, and *c*, Fig. 1, both ends being bent to the same shape, (so as to serve the same purpose as the ends of the common knitting needles used by hand, for forming the

stitch.) I suspend this hoop, *a, a*, in clamps or holders, *d, d, d, d*, in such a manner that two of the clamps, on opposite sides of the circle, will hold, or sustain, the hoop, while the clamps will be alternately opened so as to allow the work to be fed, in either direction.

I make the holders, or clamps, *d, d, d, d*, of two parts, *d*, and *e*, as represented, in section, in Fig. 3, and hold them in their places by screws passing through slots, as seen at *f, f*, Fig. 3, so that both parts may receive a longitudinal motion to open and close them. To close the clamps, I use india rubber, or any other suitable springs, as shown at *g, g, g, g*, Figs. 1, 2, and 3, attached to two pins, or projections, one of which is secured firmly in each part, as seen near *g*, Fig. 3, and to open the clamps, I use wedge-shaped cams, (as *h, h, h, h*), attached to a circle *B*, Fig. 1, (which receives a reciprocating circular motion from an eccentric seen at *C*, Fig. 2.) The points of these wedges pass through transverse slots in the part, *e*, of the clamps, and force it back, and at the same time press against the studs, or projections, *i*, Fig. 3, and thus open the clamps, and when the wedges are withdrawn the springs, *g*, will close them again, so that they will be alternately opened and closed at every stitch, and so that, while two of them are holding the hoop, *a, a*, perfectly secure, the other two will be open, and allow the work to be gradually fed by the operation of the needle, in taking off the loops.

I make the needle, *D*, with the eye near the point, (substantially in the form used in many of the sewing machines now in common use) and attach it to a needle holder, or bar, *E*, substantially as shown in section in Fig. 2. I support this needle bar in a hollow socket, *k*, Figs. 1, and 2, which is secured to the arch bar, *F*, Fig. 1, by a joint pin, or screw, *l*, Fig. 2, so as to allow it a perfectly free motion in all directions, so as to knit from either point of the hoop at pleasure. I give both a longitudinal and lateral motion (which produces a circular motion) to the needle, by means of a crank pin, or screw, *m*, set eccentric to the circle, *G*, which also works on the eccentric, or crank, *C*, so as to give a double eccentric motion, the whole being moved by a bevel gear wheel, *H*, working in a pinion, *I*, Fig.

2, which is secured immovably on its shaft, so that its crank, C, gives motion to all parts of the machine.

For narrowing, I have the arch bar, F, fitted so as to be movable longitudinally, by means of the jointed piece, K, working against the slide, *n*, or drawing it back by the bar, *p*, which is effected by a pin, or pins, *o*, set in the holes in the face of the circle, L. This circle is revolved, either way by means of a tooth, or projection, *q*, Figs. 1, and 2, on the eccentric block, C, Fig. 2, and I use as many pins as I desire to narrow times in knitting around, and place them in the appropriate holes to narrow at the desired point. As this arch bar, F, sustains the needle holder, it is apparent that a slight longitudinal motion, either way (as the machine works either way) will cause the needle to take two loops from the point of the hoop at once, and make but one stitch from them.

The teeth on the circle M, Figs. 1 and 2, tend to steady the work, and cause the loops to pass around even, and the pinions at *s* and *r*, serve to keep the loops separate while knitting, so that the point of the needle will take each loop, in plain knitting (or two loops in narrowing,) as desired.

Having thus constructed the machine, I loop the work onto the hoop, pass the yarn through the eye of the needle, (attaching it to the loops,) and apply the power to the crank, N, (or use any other power,) and revolve the wheel, O, (which carries with it the wheel H, to work the pinion, I,) in the desired direction, when the eccentrics, C, and G, will give the point of the needle a circular motion, so that its point, carrying the yarn, will pass through the loop on one of the points of the hoop and remove it from the hoop, while, as it passes around,

the other point of the hoop will pass between the yarn and needle, so that when the needle is drawn back through the loop it leaves a new stitch on the last point of the hoop and so on, to any desired extent, and while the two eccentrics, C, and G, give motion to the needle, the eccentric, C, gives a reciprocating motion to the circle B, which by means of the wedge shaped cams, *h*, *h*, *h*, *h*, which open, and close, the clamps, *d*, *d*, *d*, *d*, (in pairs, alternately) so as to allow the work to yield to the force of the needle, and circle M, to produce the feed, and the same motion of the cam, C, by means of the tooth, *g*, revolves the circle, L, which by the pin, *o*, cause the needle to take off two loops at a time, to effect the narrowing.

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

1. The combination of the eye-pointed needle, (D,) with the hoops, (*a*, *a*,) when constructed, arranged, and made to operate, substantially, as herein described.

2. I claim the method of opening and closing the clamps, (*d*, *d*, *d*, *d*,) for holding the hoops, (*a*, *a*,) by the use of the cams, or wedges, on the circle, B, when worked by the same eccentric which works the needle, when the whole is constructed, arranged, and made to operate, substantially, as herein described.

3. I also claim the method of narrowing by giving a longitudinal motion to the arch-bar, F, when constructed, arranged, and made to operate, substantially, as herein described.

ARASMUS FRENCH.

Witnesses:

J. W. BISSETT,
R. FITZGERALD.