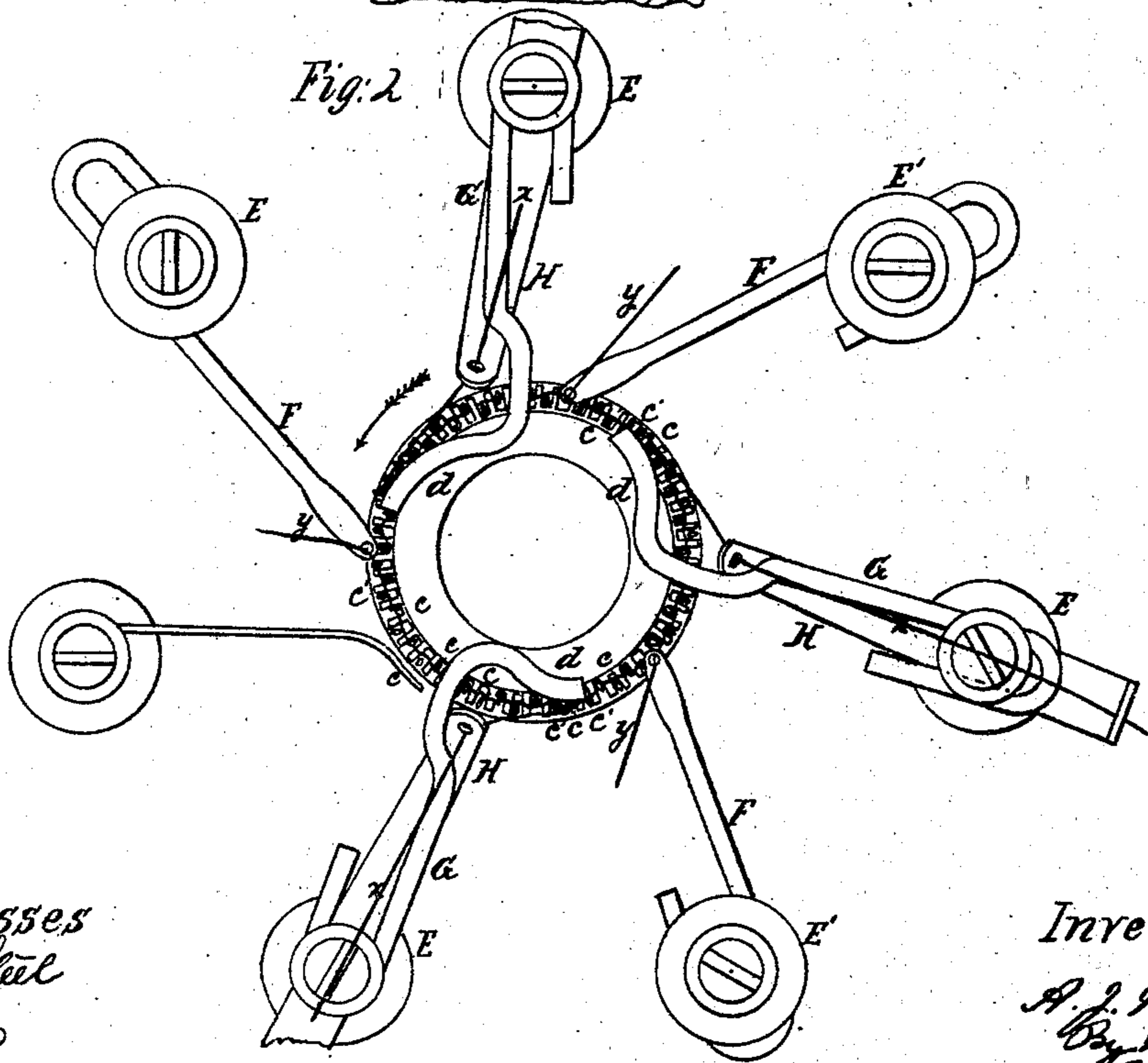
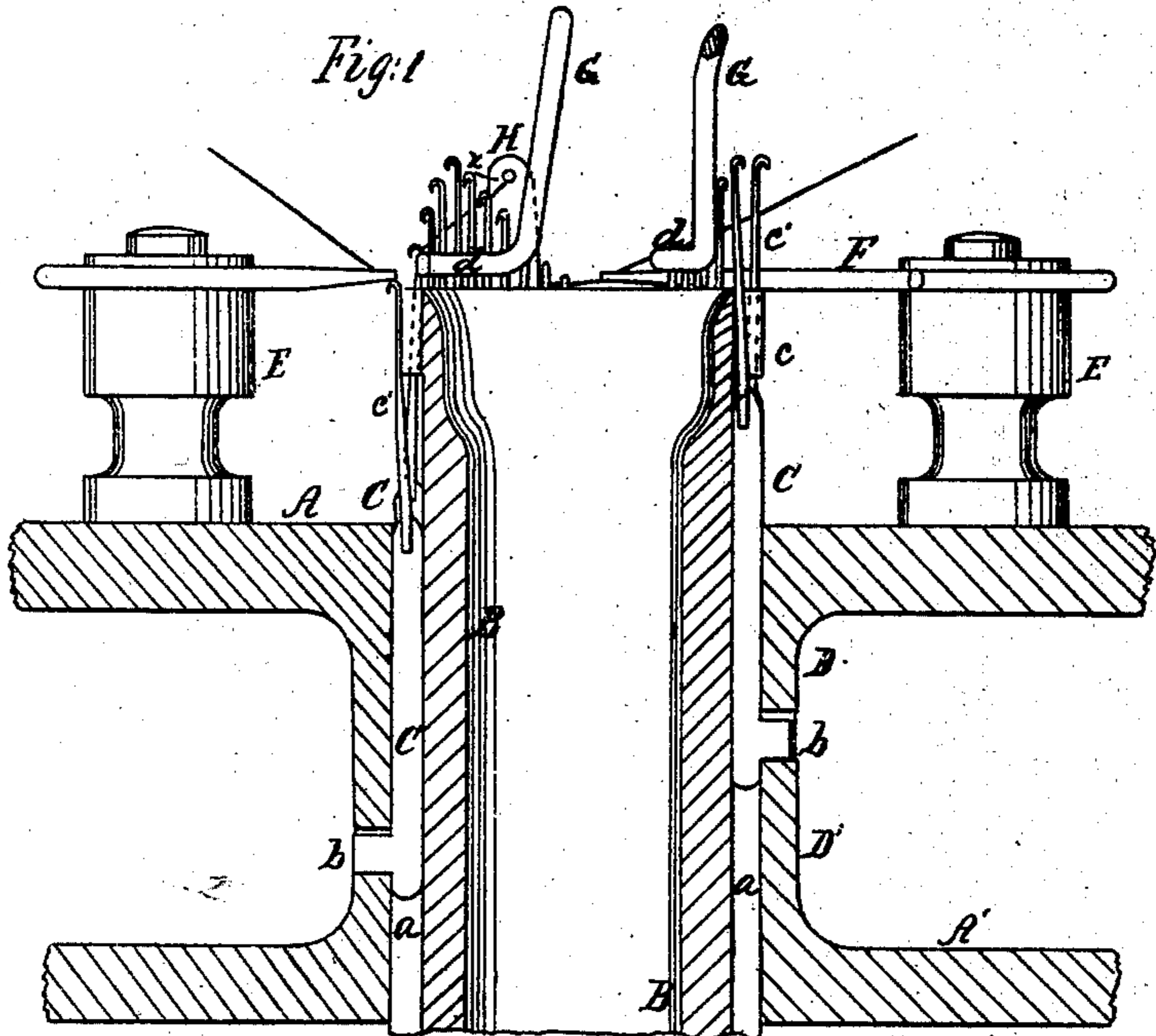


A. J. Wale. Knitting Mach.

N^o 80,099.

Patented Jul. 21, 1868.



Witnesses
Wm. Steel
J. Parker

Inventor
A. J. Wale
By his Atty
H. Howden

United States Patent Office.

ALFRED JOHN WALE, OF PHILADELPHIA, PENNSYLVANIA.

Letters Patent No. 80,099, dated July 21, 1868.

IMPROVEMENT IN KNITTING-MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, ALFRED JOHN WALE, of Philadelphia, Pennsylvania, have invented an Improvement in Knitting-Machines; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention consists of certain thread-guides and cams arranged and operating as fully described hereafter, in connection with a circular-knitting machine, in which some of the needles project outward beyond the others, so that a supplementary thread or threads may be embedded in the fabric, to decrease its transverse elasticity and increase its density.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation, reference being had to the accompanying drawing, which forms a part of this specification, and in which—

Figure 1 is a sectional elevation of my improved knitting-machine, and

Figure 2 a plan view.

A A' are parallel stationary plates, through which extends a hollow cylinder, B, having at the outside vertical grooves or channels, *a*, for the reception of needle-slides or bars, C, projections *b* on the latter extending between the opposite edges of two annular cams or projections, D D', on the plates A A'.

To some of the bars C are secured needles *c*, and to others, needles *c'*, the former being bent so as to be almost in contact with the face of the cylinder B, while the latter are bent outward, their upper ends being almost on a line with the outer edges of the bars C, to which they are attached, the two sets of needles alternating as shown in the drawing.

To standards E, on the plate A, are secured three thread-guides, H H H, and to intermediate standards, E', are secured thread-guides F. Within the cylinder, at equal distances apart, are arranged three cams *d d d*, each of which is attached to or forms a part of a rod, G, secured to one of the standards E.

A rotary motion in the direction of its arrow is imparted to the cylinder B, the cams D D' being of such a shape, and the guide F and cams *d* being so arranged that each needle will begin to rise above the upper edge of the cylinder as it passes from beneath either of the said guides F, and will descend below the edge of the cylinder immediately after passing from contact with the adjacent cam *d*.

These cams *d* are of such a form that the needles *c*, as they are carried past each cam, are bent outward, until they occupy the same position as the needles *c'*, and with the said needles will therefore catch the thread *x*, passing from the guides H, and will carry the threads in loops through the loops of fabric on the shanks of the needles in a manner too well known to those familiar with knitting-machinery to need particular description.

As the needles begin to rise, after passing from beneath the end of each guide F, a thread, *y*, will be directed by the said guide to such a point above the edge of the cylinder that each needle *c* will rise at the inside, and each needle *c'* at the outside of the said thread, which is thus laid between the two sets of needles, and is, consequently, interlocked with the loops of the fabric, and is embedded in the latter, although it is not itself formed into loops.

The introduction of a thread in this manner, while it imparts density to the fabric, also limits its transverse elasticity. The fabric thus approximates, both in its appearance and character, to loom-made goods, and when fulled and shorn, cannot be readily distinguished therefrom, and it has the advantage over woven fabrics, as regards economy, by reason of the greater rapidity and facility with which it can be manufactured.

A cylinder of any desired diameter, and carrying any "gauge" of needles, may be used to produce fabrics of any desired width and texture, while the number of thread-carriers or guides may be increased or diminished as required.

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

The cylinder B, with its slides and its needles, some of which project outward beyond the others, in combination with supplementary thread-guides F and cams *d*, the whole being constructed, arranged, and operating substantially as and for the purpose described.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

ALFRED JOHN WALE.

Witnesses:

JOHN WHITE,

C. B. PRICE.