Sheet 1. 2 Sheets.

J. Pepper Jr.
Knitting Machine.

No. 12,046. Patented Dec. 5, 1854.

Fig: 1.

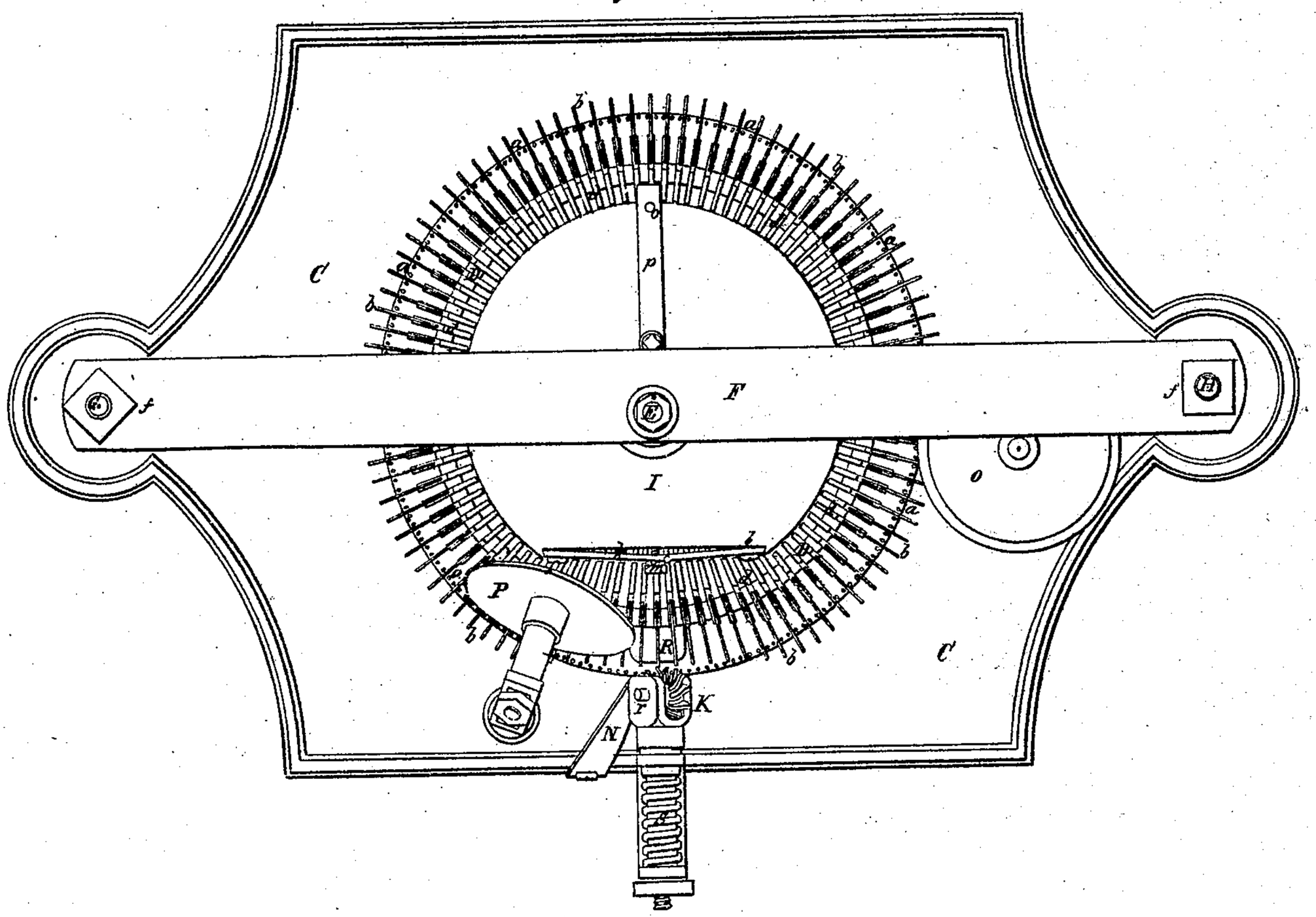
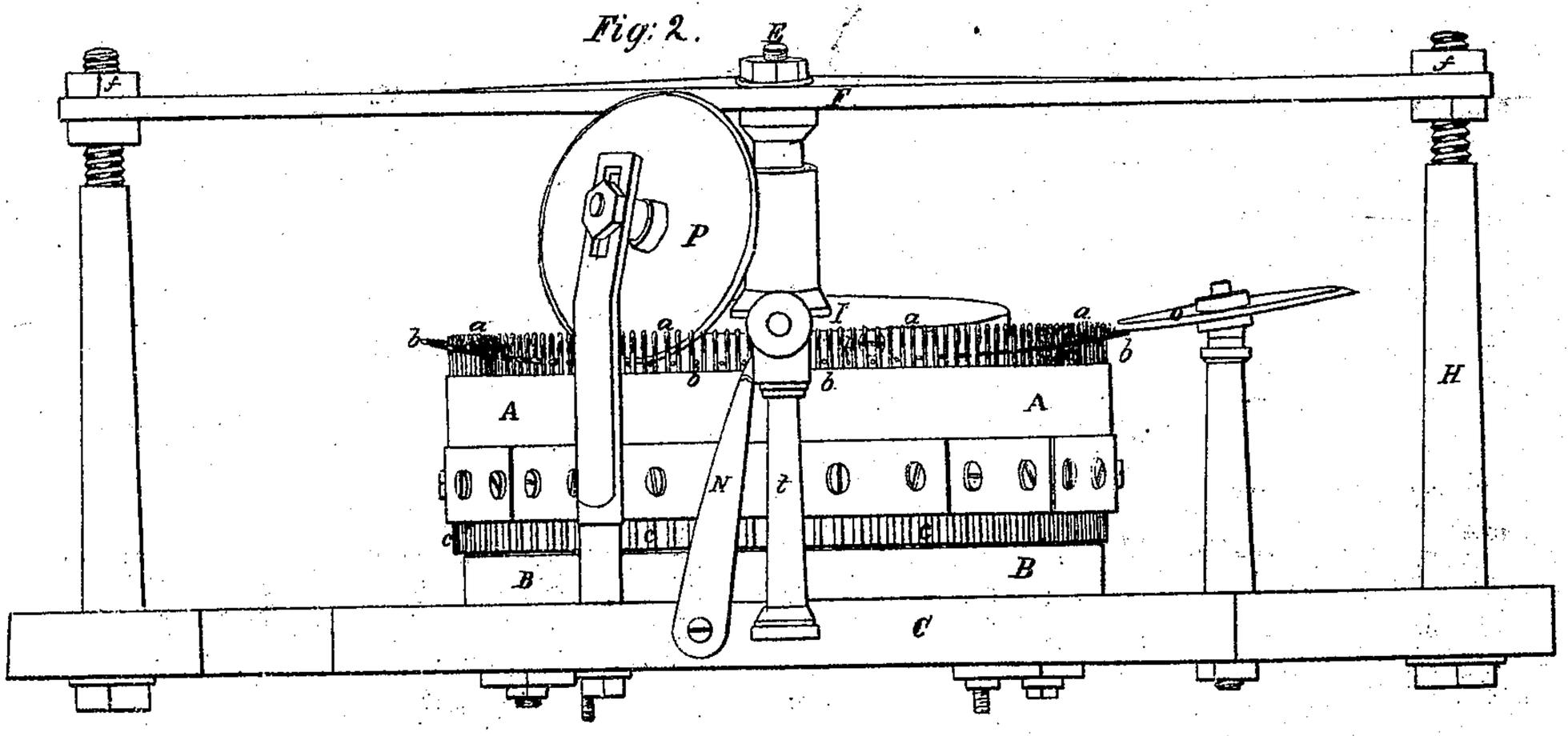


Fig: 2.



Sheet-2. 2 Sheets.

J. Penner Jr.

Knitting Machine.

No. 12,046. Patented Dec. 5, 1854

Fig: 7.

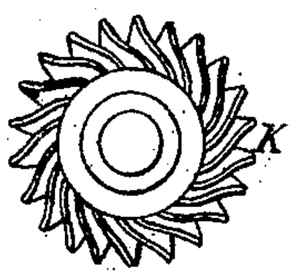


Fig: 8.

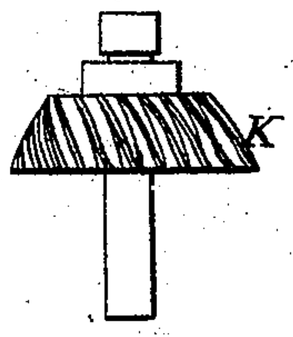


Fig: 4.

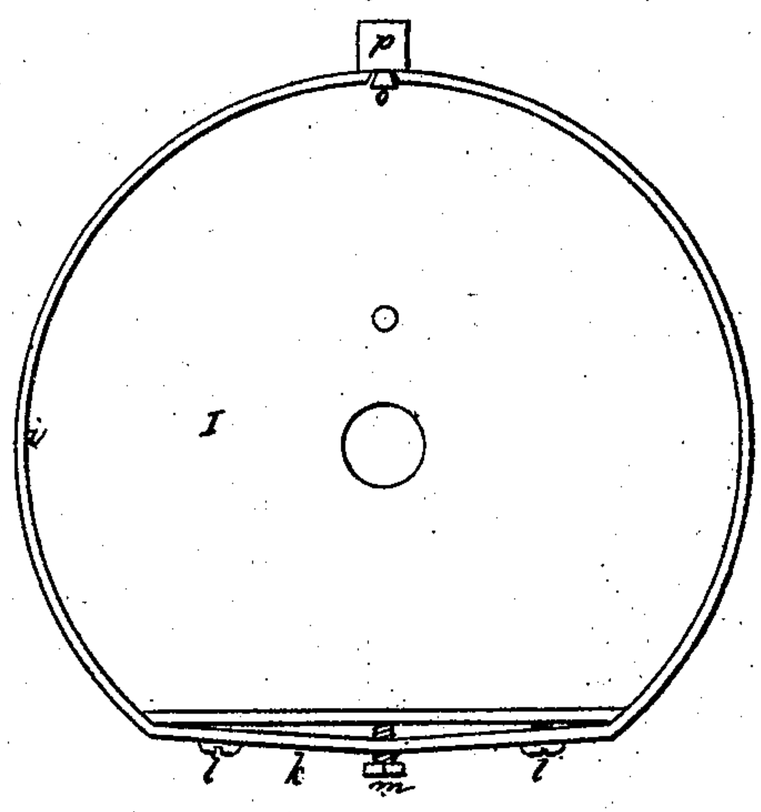


Fig: 6.

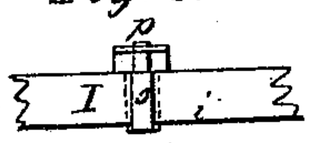


Fig: 5.

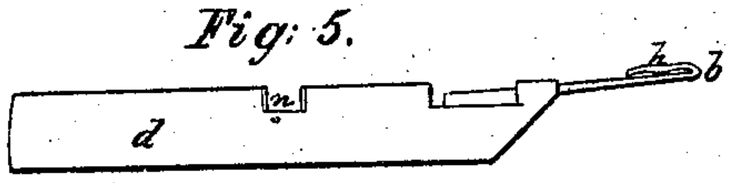
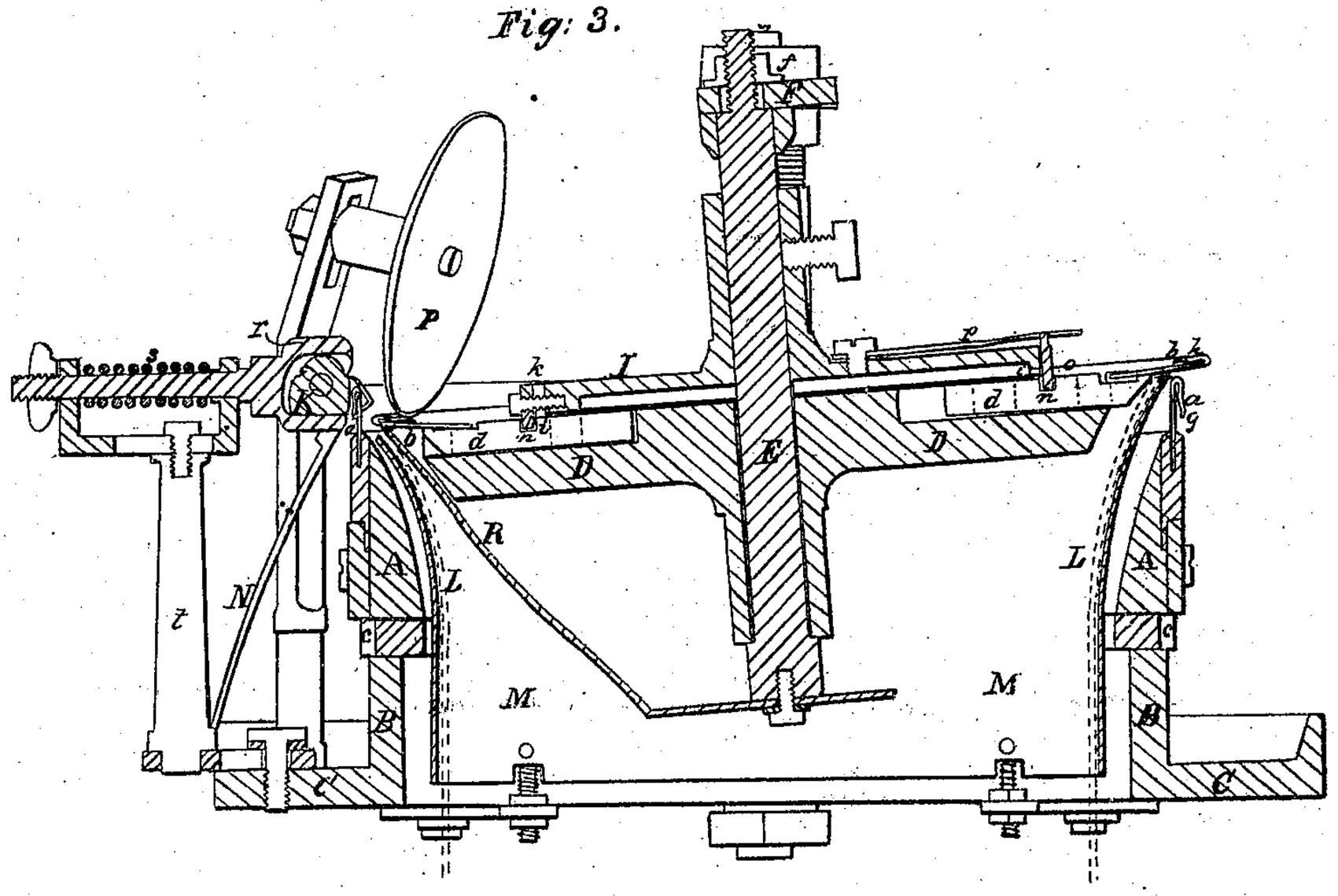


Fig: 3.



UNITED STATES PATENT OFFICE.

JOHN PEPPER, JR., OF PORTSMOUTH, NEW HAMPSHIRE, ASSIGNOR TO THE FRANKLIN MILLS.

KNITTING-MACHINE.

Specification forming part of Letters Patent No. 12,046, dated December 5, 1854; Reissued October 27, 1863, No. 1,555.

To all whom it may concern:

Be it known that I, JOHN PEPPER, JR., of Portsmouth, in the county of Rockingham and State of New Hampshire, have invented a new or Improved Machine for Knitting Ribbed Work; and I do hereby declare that the nature of my said invention and the manner in which it is to be performed are particularly described and represented in the following specification and the accompanying drawings, letters, figures, and references thereof.

Of the said drawings, Figure 1, denotes a top view; Fig. 2, a front elevation; and Fig. 3, a central, vertical and transverse section of my said machine; Fig. 4, is an underside view of the stationary cam plate of it to be hereinafter described.

In constructing my said invention, I employ, First. A series of hooked needles (such as are used in hosiery looms) standing vertical and arranged in a circle (and with their upper ends on a level) and affixed to a frame or wheel made to revolve horizontally. Second. Another series of such needles placed within the first and arranged in one plane and standing in radial directions from a common center and having their plane so inclined to the plane of the upper edges of the first series of needles as to cut it and dip below it on one side and rise above it on the other side of it; the needles of the second series being projected from slides or bars supported on and made to slide on the top of a ring or frame, that is placed within the frame of the first series of needles and concentric with it and made to rotate freely with it. Third. A stationary cam plate (or its equivalent) so made and applied to the slides of the second series of needles as to actuate them with respect to those of the first series in the proper manner and at the proper times for the performance of the ribbed work or fabric. Fourth. A rotary toothed sinker wheel so made and applied to the first series of needles as to lay the yarn on them and in their hooks as may be necessary to the formation of loops on the second series of needles. Fifth. Two rotary wheel pressers, one of which is applied to each set or series of needles and so arranged as to close the barbs or hooks of its needles down upon the shanks thereof at the proper time and just previous to the passage of the barb through the loop that may be on the shank of its needle. The parts above mentioned so combined and arranged constitute a combination, which may be considered as containing the principle or nature of my invention. To such I have added certain improvements, viz, a means of readily removing any of the needles of the second series from the rest of such series, in case of accident, or when desirable. Also a means of regulating the distance of back motion or drafts of the lowest needles of the second series.

The first series of hooked needles is represented at *a*, *a*, *a*, etc., in the drawings. The needles of such series are shown as arranged in a circle and made to stand vertically and with their upper ends on a level. The said series of needles is affixed to a circular frame, A, or wheel that is made to revolve horizontally. This frame rests and is supported on a circular flange, B, B, that is elevated on the bed-plate or main frame, C, of the machine.

A series of gear teeth, *c*, *c*, *c*, etc., is arranged on and around the external surface of the frame, A. When the machine is to be operated, these gear teeth are made to engage with a suitable driving gear or pinion put in revolution by some proper driving power, and thus the frame, A, and the first series of knitting needles are put in rotation.

The next, or second series of hooked needles is seen at *b*, *b*, *b*, etc. Each of the said needles is made to project from one of a series of slides, *d*, *d*, *d*, etc.; one of such slides and its needle being represented in Fig. 5 in side view.

The second series of needles is placed within the first series and disposed in one plane. The several needles of the second series are arranged in radial directions from one common center as seen in Fig. 5. Their plane is so inclined to the plane of the upper edges of the first series of needles as to cut it and dip below it on one side and rise above it on the other side of it.

The several slides *d*, *d*, *d*, etc., of the needles *b*, *b*, *b*, etc. are supported by and made to slide on the top of a circular ring, wheel or frame D, that is made to turn

freely on a stationary axle, E, whose axis is arranged to stand perpendicular to the plane of the second series of needles. This axle projects downward from a cross bar, F, which is supported over the needles by two posts or standards G, H, arranged as seen in the drawings, adjusting screws and nuts being applied to the tops of the standards as seen at, *f*, *f*, in order to regulate the elevation of the second series of needles with respect to the first series.

The positions of the two barbs, *g*, *n*, of two adjacent needles of the two series of needles are shown in the drawings, the barbs or hooks of the first series being made to stand on their outer sides, while those of the second series are arranged on the upper sides of their respective needles.

Attached or fastened to the axle, E, is a stationary cam plate, I, which is arranged in a plane parallel to that of the second series of needles and has a lip or flanch, *i*, extended downward from it or near its edge, for about five sixths of its circle as seen in Figs. 3 and 4. The remainder of the lip is not circular but is formed of a spring plate, *k*, that is attached to the plate, I, by two screws, *l*, *l*, that pass through holes made through the spring plate and of somewhat larger size or diameter, than that of the shanks of the screws. Through the middle of the spring plate a screw, *m*, is screwed and made to abut against the cam plate. By turning up the screw, the middle of the spring plate is thrown outward. By reversing the screw or turning it back the middle part of the spring plate is suffered to move inward. This addition of the spring plate to the circular part of the lip of the cam, or in other words the making a part of the said lip capable of being sprung or moved, and by an adusting screw [or its equivalent] applied to it affords to us a means of regulating the extent of back motion or draft of the lowest needles of the second series, the spring plate being applied to such needles. The lip of the cam, I, extend into recesses or notches made in the needle slides, as seen at, *n*, in Figs. 3, and 5.

While a revolving motion is given to the two series of needles and the series of needle slides of the second set of needles, the cam plate is kept perfectly stationary. It or its lip will cause the needles of the second series to have a reciprocating or backward and forward movement, while their slides are passing on that part of the cam lip, termed the spring plate, *k*. While the needle slides transversely on the circular part or rest of the lip they will have no such motion, but will project between and beyond the needles of the other set as seen in the drawings.

A part, *o*, of the lip is made movable and attached to a spring, *p*, fastened to the top of the cam plate as seen in Figs. 1, and 3. A front view of this small piece or part, *o*, and a part of the lip are shown in Fig. 6. By raising the spring, the piece or part, *o*, can be lifted from the lip, and as such part and its opening in the lip should be made respectively of a greater width than either of the needle slides, it will readily be seen that we have a ready means of removing a needle and its slide from the frame D, and this in case of accident or when it may be desirable so to do.

The second set of needles are carried or moved around by and with the first series when it is put in revolution and during the passage of each needle of the second series around its circle, it will be elevated entirely above the needles of the first series, and in passing to a point of the circle one hundred and eighty degrees, it will be caused to descend between and below the barbs of the needles. By this peculiar operation of the second series of needles on the first series, the yarn laid on the needles of the first series by the rotary toothed sinker wheel K, is subsequently laid in the form of loops on the needles of the second series.

The work or fabric seen at, L, is supported on a tubular rest, M, that extends around within the frame A, and is fastened to the base plate or main frame of the machine by such contrivances as will admit of its correct adjustment. The upper edge of the rest, M, is extended nearly up to the undersides of the needles of the second series, there being a space between it and the said needles sufficient for the passage of the work which hangs from the needles and within the rest, M, as seen in the drawings.

The rotary sinker or toothed wheel, K, is represented in top view in Fig. 7, and in side view in Fig. 8. It is supported by and revolves freely within a frame, *r*, that is forced toward the first series of needles by a spring, *s*, the whole being sustained on the top of a standard or post, *t*, and arranged as seen in the drawings. Near the sinker wheel is the yarn guide, N, through which the yarn is conducted to the sinker wheel. The said sinker wheel is to be constructed and made to operate like those in use in the common French rotary knitting looms for knitting plain or unribbed work. Its teeth engage with the range of needles and lay the yarn in a corrugated crimped or wrinkled form on the needles and raise it up between their barbs and shanks or into their hooks; the rotation of the sinker wheel being produced by the rotary movement of the first set of needles.

To each set or series of needles, there is arranged and applied as seen in the drawings a rotary wheel presser, O, or, P, it being so arranged as to revolve freely on its supporting axle, and close or move the barbs down upon the shanks of the needles of its

set at the proper time, or just before the stitch of a needle is to be moved on such needle and cast over its end or the loop on it in order to form a new stitch.

In order to keep the work down at a sufficient distance from the sinker wheel, I make use of a narrow spring bearer, R, that is attached to the lower end of the stationary axle F, and made to extend upward and rest on the work as seen in Fig. 3. In the performance of ribbed work by my machine, I make use of half the number of needles in the second series, that there is in the first one, they being conjointly arranged as seen in the drawings. When a row of stitches is cast on each series of needles and the machine is set to work, it will perform the operation of knitting the fabric in a tubular form.

I do not limit my invention to such a proportion of needles in both series.

What I claim is—

1. The combining an annular series of hooked needles and a series of radial and sliding hooked needles so as to operate together and with a rotary toothed wheel or sinker, K, and two rotary presser wheels, and produce ribbed work substantially as specified.

2. I also claim the improvement of making a part of the cam or lip of the cam plate adjustable substantially in the manner and for the purpose of removing a needle of the second series from the rest when necessary or desirable as specified.

3. And I claim the arrangement of the second series of needles with respect to the other or first series, that is to say, the so arranging them that their plane shall cut that of the upper ends of the needles of the first set and dip below and rise above the same as staked, such an arrangement causing the stitches of the first set of needles to be elevated and cast off, or over the loops or yarn of the second set, by the lifting power or action of the second series during its rotary movement as specified.

In testimony whereof I have hereto set my signature this sixteenth day of November A. D. 1852.

JOHN PEPPER, Jr.

Witnesses:

R. H. Eddy,

H. Halvorson.

[First Printed 1913.]