(No Model.) 3 Sheets—Sheet 1.

A. C. BUGBEE.

CIRCULAR KNITTING MACHINE.

No. 439,050. Patented Oct. 21, 1890.

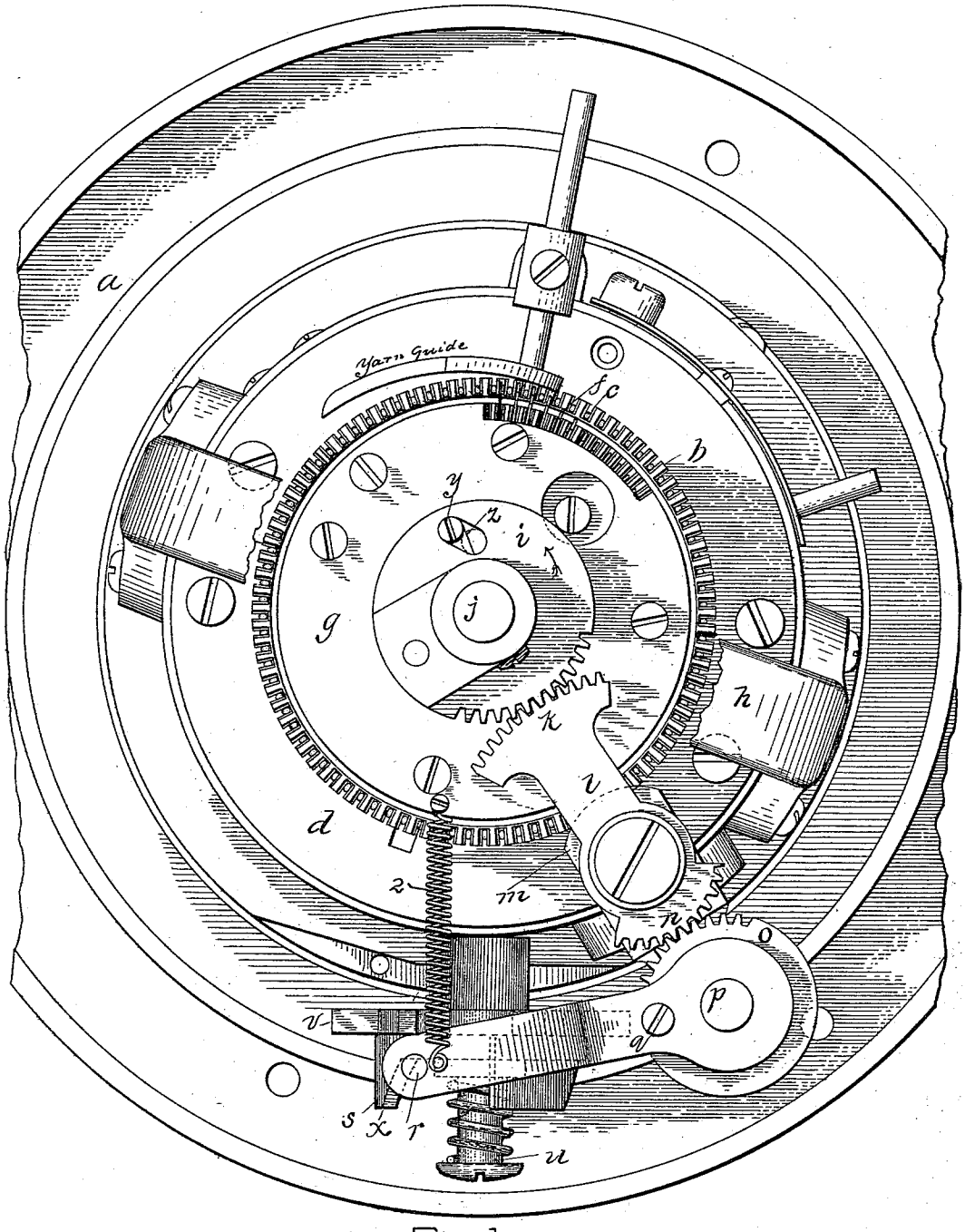


Fig. 1.

WITNESSES:
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Edwin W. Hamlen

INVENTOR:
A. C. Bugbee
by Wilson Brown & Crosby
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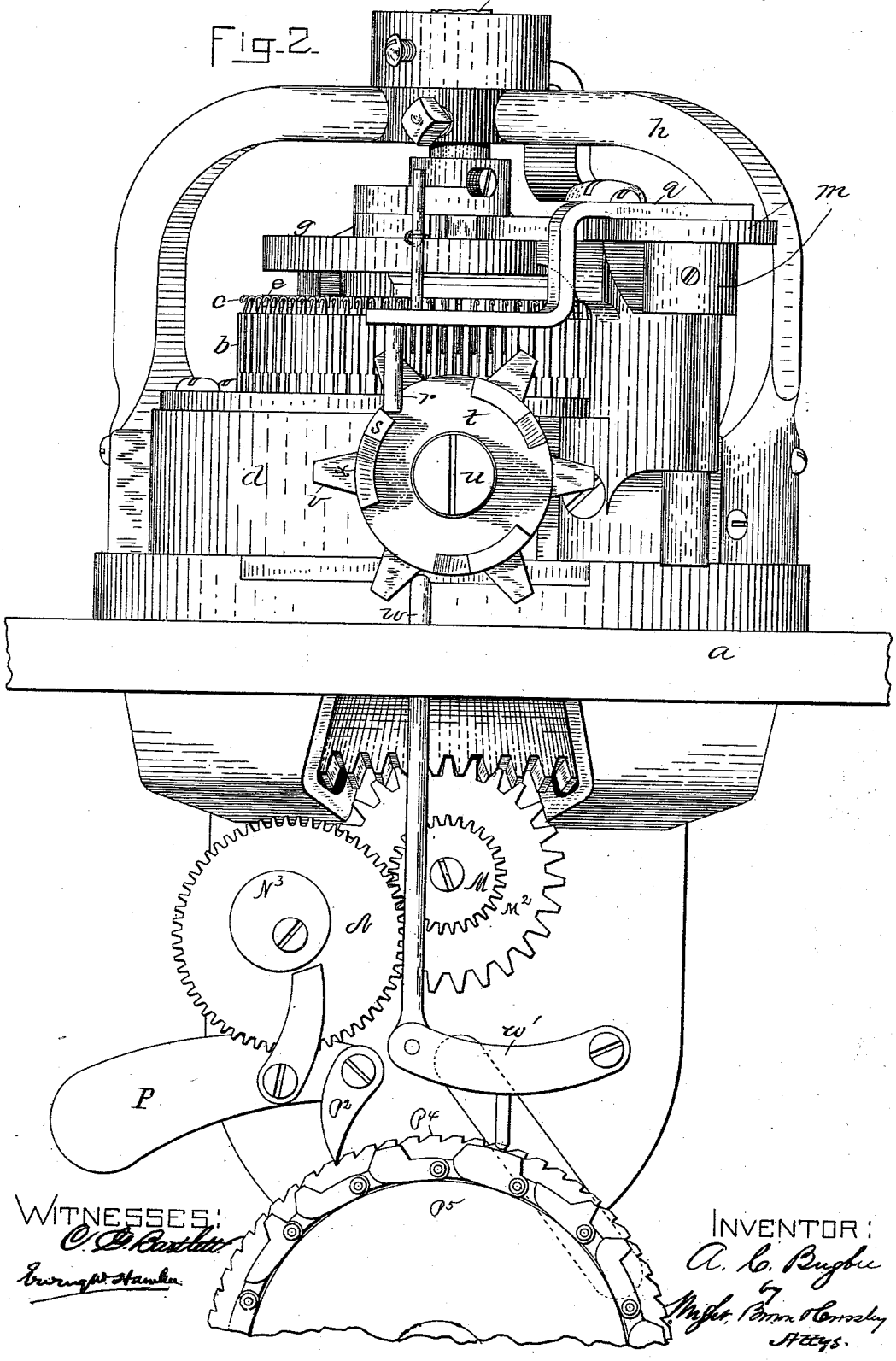
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A. C. BUGBEE.

CIRCULAR KNITTING MACHINE.

No. 439,050. Patented Oct. 21, 1890.

Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

A. C. BUGBEE.

CIRCULAR KNITTING MACHINE.

No. 439,050. Patented Oct. 21, 1890.

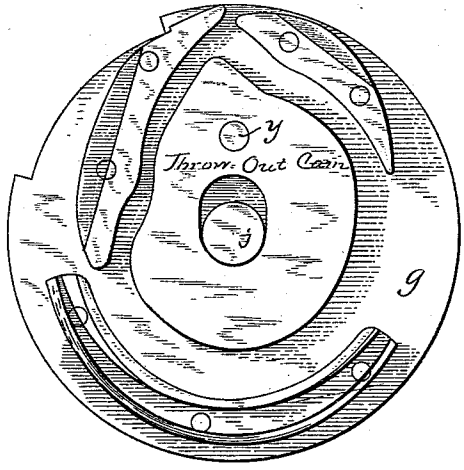


Fig. 3.

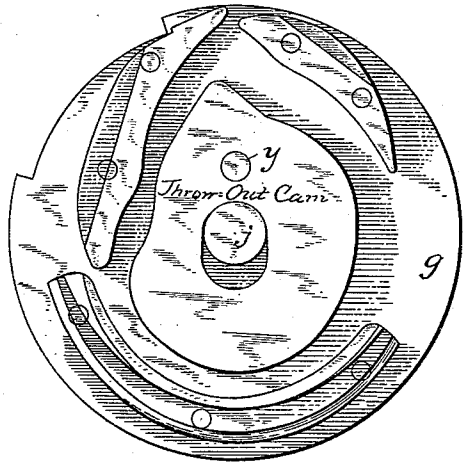


Fig. 4.

WITNESSES:
C. E. Bartlett
Ewing W. Hawkins

INVENTOR:
A. C. Bugbee.
by
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALMON C. BUGBEE, OF LAKE VILLAGE, ASSIGNOR TO WARREN D. HUSE, OF LACONIA, NEW HAMPSHIRE.

CIRCULAR-KNITTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 439,050, dated October 21, 1890.

Application filed March 27, 1890. Serial No. 345,546. (No model.)

To all whom it may concern:

Be it known that I, ALMON C. BUGBEE, of Lake Village, in the county of Belknap and State of New Hampshire, have invented certain new and useful Improvements in Circular-Knitting Machines, of which the following is a specification.

My invention relates particularly to that class of circular-knitting machines which is designed to produce ribbed work and to knit what is commonly termed "welts" at the edge of the fabric.

The object of my invention is to provide an improved machine of the kind referred to.

Reference is to be had to the annexed drawings, and to the letters of reference marked thereon, forming a part of this specification, the same letters designating the same parts wherever they occur.

Of the drawings, Figure 1 is a broken top view of a circular rib-knitting machine embodying my improved means and adapted to carry out my improvements in the mode of knitting welts. Fig. 2 is a side elevation of the machine shown in Fig. 1. Figs. 3 and 4 are diagrams illustrating the different positions of one form of dial-cams that may be employed in my improved mode of knitting welts, the dial-cam plate being shown as inverted.

In the drawings, *a* designates the bed of the machine; *b*, the needle-cylinder; *c*, the cylinder-needles; *d*, the rotary cam-cylinder for reciprocating the cylinder-needles vertically. *e* is the needle-dial; *f*, the dial-needles; *g*, the cam-dial equipped with cams for reciprocating the dial-needles radially and horizontally, and *h* the yoke which connects the cam-cylinder with the cam-dial. The yoke is shown as removed in Fig. 1, in order to better illustrate the invention.

The parts thus far described may be of common construction and function, excepting as hereinafter described—that is, they may be constructed and arranged so as to perform rib-knitting by reciprocating the dial and cylinder needles to take a yarn and form stitches at the same point.

i designates a circular plate connected to the cam-dial *g*, and the latter is adapted to be rotated to a limited extent on the spindle *j*. The plate *i* is provided with teeth which are engaged by the teeth formed on the segment *k* of a lever *l*, pivoted upon a bracket *m*, connected with the cam-cylinder *d*. The outer end of the lever *l* is provided with a toothed segment *n*, which engages the teeth formed on the periphery of a disk *o*, adapted to turn on a spindle *p*, arranged in bracket *m*.

q designates a lever connected with the disk *o* and provided at its free end with a vertically-arranged pin *r*, which extends down into position to come in contact with cams *s*, formed on the side of a wheel *t*, adapted to turn on a stud *u*, connected with the cam-cylinder *d*. A spring Q, fastened to the dial-plate and lever *q*, serves to hold the pin *r* against the wheel *t* or its cams *s*. The wheel *t* is provided on the inner edge of its periphery with teeth *v*, which are adapted to engage with the upper end of a rod *w*, which may be raised through the bed *a* at predetermined periods by means of a pattern-chain P, whose links act upon a lever *w'*, carrying the said rod *w*, as shown in Fig. 2, or by other suitable means.

The pattern-chain-carrying wheel has motion imparted to it by a pinion M, rotating with the gear-wheel M^2, in engagement with the teeth on the cam-cylinder, the said pinion meshing with and turning a gear-wheel N, with which rotates a cam N^3, that rocks a weighted lever P, having a pawl P^2, whose lower end acts upon the toothed perimeter P^4 of the pattern-chain-carrying wheel P^5 to give it the required movement.

With this construction and arrangement of parts, when they are in the position shown in Figs. 1 and 3 plain rib-knitting will be performed, the dial and cylinder needles being thrust out and raised at the same point. When, however, it is desired to produce a welt, the rod *w* will be raised so as to engage one of the teeth *v* of wheel *t* and move the same so that the pin *r* on the lever *q* will be moved by the cam *s* to the point *x*, which will result in turning the disk *o* and operating lever *l* so as to move the cam-dial *g* on spindle *j* in the direction indicated by the arrow marked on the cam-dial in Fig. 1, and so effect the

projection or throwing out of the dial-needles some distance in advance of the point at which the cylinder-needles are raised. Upon beginning the rotation of the plate *i* on spindle *j* said plate will move independently of the cam-dial *g* until the pin *y*, secured upon the throw-out cam and extending through the slot *z*, shall have been moved from the position in the said slot *z* in which it is shown in full lines in Fig. 1 to the position in said slot in which it is represented in dotted lines, the effect of which will be to move the throw-out cam on the cam-dial in a common and well-known manner, as shown in Fig. 4, so that it will not project the dial-needles far enough to carry the loops thereon back of the latches. Upon the further rotation of the plate *i* it will carry the cam-dial with it, rotating it upon the spindle *j* to an extent which will effect the projection of the dial-needles considerably in advance of the point at which the cylinder-needles are raised to take the yarn. With this adjustment of parts knitting will be performed on the cylinder-needles alone, the dial-needles failing to take the yarn. One or more courses will be knitted with the parts adjusted in the manner described, when the rod *w* will be again raised so as to strike one of the teeth *v* and turn wheel *t* a distance corresponding to that between any two teeth *v*, bringing the stud *y* back to the position in which it is represented in Fig. 1, turning disk *i* in a direction opposite to that in which it was previously moved and rotating cam-dial *g* in a direction opposite to that which is indicated by the arrow, so as to bring the cam-dial and cams connected therewith back to the position represented in Figs. 1 and 3, projecting the dial-needles to their fullest extent and at the same point where the cylinder-needles are raised, so as to effect regular rib-knitting, as before.

It is obvious that changes in the form and arrangement of parts comprising my improvements may be made without departing from the nature or spirit thereof.

Having thus explained the nature of my invention and described a way of constructing and using the same, I declare that what I claim is—

1. In combination, the needle-cylinder and its needles, the cam-cylinder, the needle-dial and its needles, the diametrically-movable throw-out cam on the cam-dial, and the said cam-dial, this last being movable angularly to change the position of its cams with respect to the cam-cylinder, as set forth.

2. In combination, the needle-cylinder and its needles, the cam-cylinder, the needle-dial and its needles, the diametrically-movable throw-out cam on the cam-dial, the said cam-dial, this last being angularly movable to change the position of its cams with respect to the cam-cylinder, and means for moving the throw-out cam and cam-dial, as set forth.

3. The combination, with the needle-cylinder, needle-dial, needles, cam-cylinder, and cam-dial having the diametrically-movable throw-out cam, the cam-dial being adapted to be moved angularly in its relation to the cam-cylinder, of a plate *i*, movable angularly to a limited extent independently of the cam-dial, said plate being connected with the throw-out cam of the cam-dial and adapted to move the same, and a lever pivoted upon the cam-cylinder and engaged with the plate *i*, whereby the throw-out cam on the cam-dial may be moved and the latter moved angularly in its relation to the cam-cylinder, as set forth.

4. The combination, with the needle-cylinder, needle-dial, needles, cam-cylinder, cam-dial, and the disk connected with the cam-dial, the dial being adapted to be moved angularly in its relation to the cam-cylinder, of a lever pivoted upon the cam-cylinder and connected with the disk *i* to move the same and the cam-dial angularly in its relation to the cam-cylinder, spindle *p*, lever *q*, provided with pin *r*, cam-wheel *t*, provided with teeth *v*, and rod *w*, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 20th day of February, A. D. 1890.

ALMON C. BUGBEE.

Witnesses:
ARTHUR W. CROSSLEY,
WARREN D. HUSE.