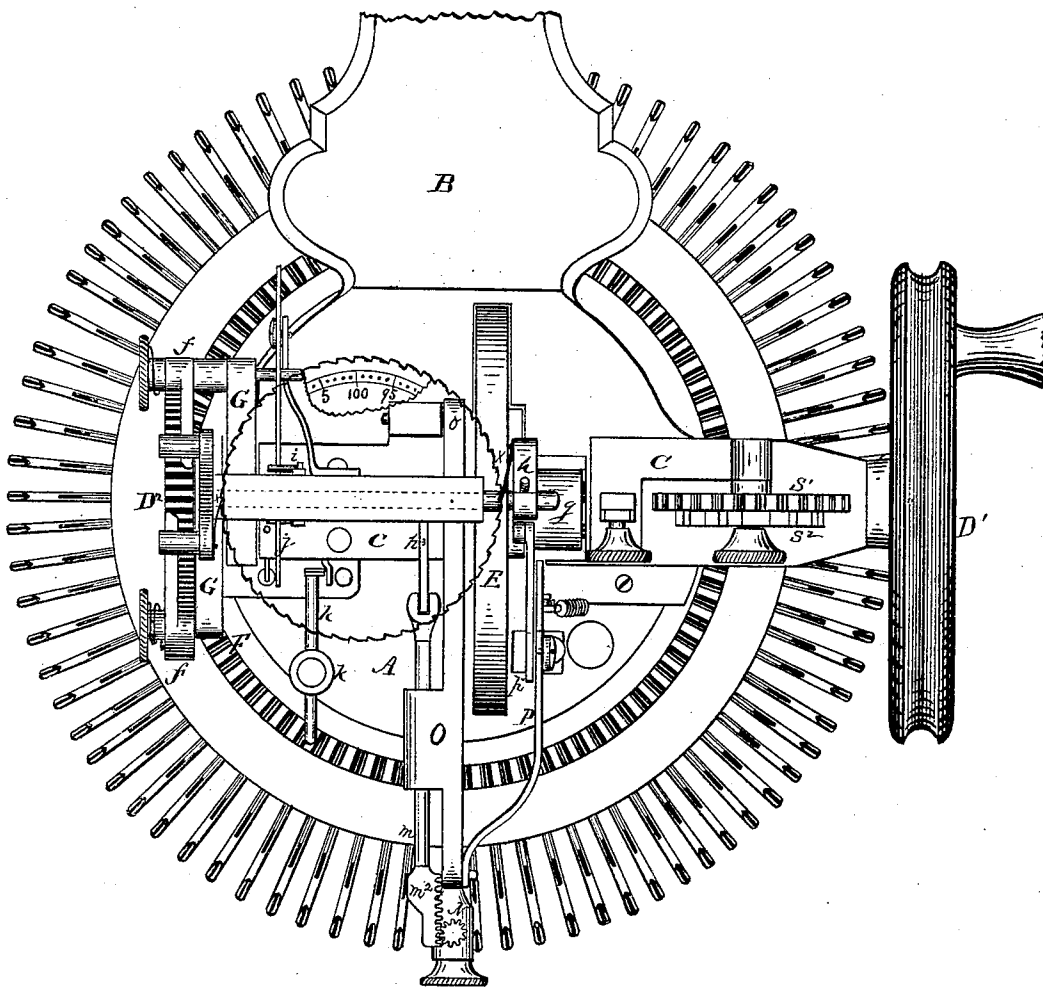


E. P. CURTISS.
Knitting-Machines.

No. 150,228.

Patented April 28, 1874.

Fig. 1.



Witnesses.

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Alb. Soren

Inventor.

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Fig. 2.

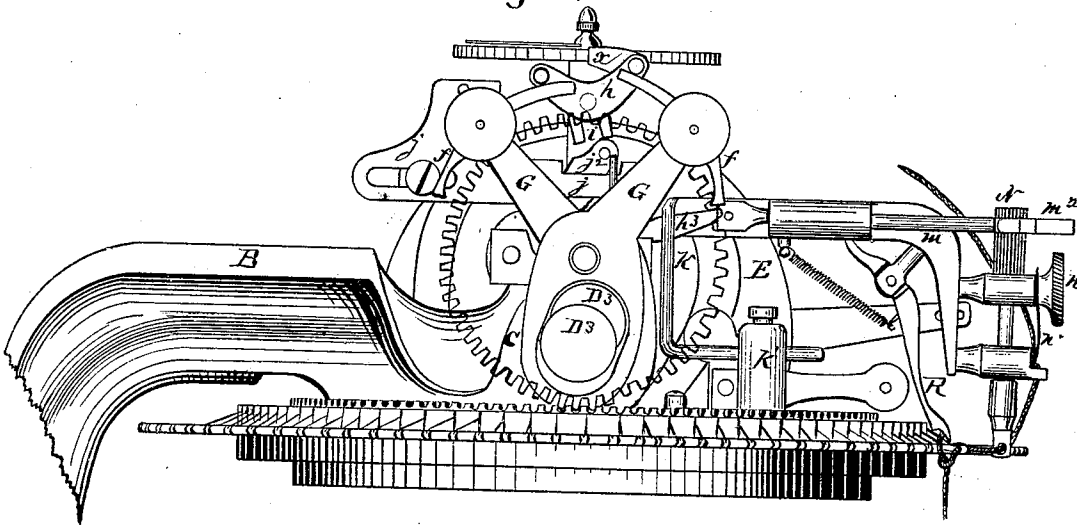


Fig. 4.

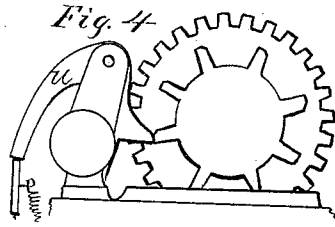
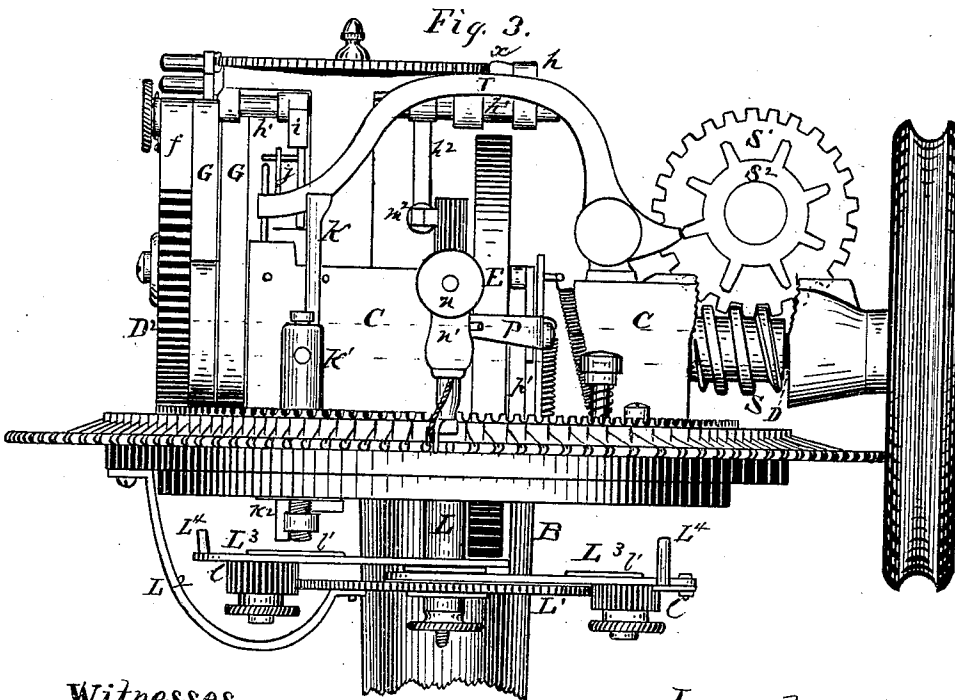


Fig. 3.



Witnesses

Geo. W. Schmitt
Alfred Loren

Inventor.

Edward P. Curtiss

UNITED STATES PATENT OFFICE.

EDWARD P. CURTISS, OF CLEVELAND, OHIO, ASSIGNOR OF ONE-HALF HIS RIGHT TO THEODORE C. FOOTE, OF SAME PLACE.

IMPROVEMENT IN KNITTING-MACHINES.

Specification forming part of Letters Patent No. **150,228**, dated April 23, 1874; application filed April 15, 1874.

To all whom it may concern:

Be it known that I, E. P. CURTISS, of Cleveland, county of Cuyahoga and State of Ohio, have invented a Knitting-Machine, of which the following is a specification:

The nature of this invention consists in certain improvements in knitting-machines, as hereinafter described and claimed.

To enable others to fully understand my invention, I will proceed to describe the same in detail by the aid of the accompanying drawings, in which—

Figure 1, Sheet 1, is a top or plan view. Fig. 2, Sheet 2, is a side elevation with feed-wheel shown in outline. Fig. 3, Sheet 2, is a front elevation. Fig. 4, Sheet 2, is a detached view of a device for knitting ribbed work.

Like letters indicate like parts in the several drawings.

A is the base of the machine, to which is attached the clamp-neck B, by which the machine is secured to a table or support. To the neck B is cast the box C for the main shaft D, from which shaft all the working parts derive their motion. On the shaft D, near the middle of the base, is attached a cam-wheel, E, for working the needle-bar. The shaft D extends through from one side of the machine to the other, having on one end the crank or driving wheel D¹, and on the opposite end two eccentrics, D³, for operating the feed mechanism. D² is a feed-wheel, turning on a pin fixed in the end of the box above the shaft D, and meshes with the crown-gear of the needle-disk F. The feed mechanism is operated by means of pawls *f f*, attached to pawl-arms G G, which are pivoted on the same pin with the feed-wheel D², the lower portion of the pawl-arms being made in the form of yokes, and operated by the eccentrics D³ on the shaft D. For reversing the feed motion, the said pawls are tripped alternately by a rocker-arm, *h*, on a rock-shaft, *h*¹. The said rock-shaft has its bearing through the upper part of a T post, and has attached to it a fork, *i*, by which it is oscillated for the purpose of tripping the pawls, said oscillating motion being obtained through a sliding lever, *j*, operated by one of the pawl-arms G, the said sliding lever *j* having shoulders, one on the upper and one on the lower

side, which, alternately coming in contact with a pin on the oscillating-lever *j*², oscillates the rock-shaft *h*¹. The said sliding lever *j* is lifted or dropped by a bent arm, K, attached to the upright oscillating shaft K¹ passing through the base A to the under side of the machine, where it has an arm, K², attached. A center stud, L, on the under side of the base A, supports a gear-wheel, L¹, carried by a bent arm, L², attached to the said wheel and needle-disk F. On the stud L are two arms, L³, carrying pinions *l l*, meshing with the said gear-wheel L¹, and retained in position by spring-pawls *l'* *l'*, except when changed by the operator. At the ends of the arms L³ are pins L⁴, which, as the needle-disk rotates, come in contact with the arm K², causing the shaft K¹ to oscillate, thus swinging the bent arm K in front of or away from the sliding lever *j*, by means of which the latter is either lifted or dropped. Attached to the rocker-shaft *h*¹ is an arm, *h*², connected by a rod, *h*³, to a sliding rod, *m*, carrying a rack, *m*², for reversing the yarn-carrier N. The oscillation of the rock-shaft also operates, by means of spring-pawls *x x*, a dial for indicating the number of rows knitted. O is a vibrating arm, pivoted at *o* to the box C, and to the front end of which is attached the rotating yarn-carrier N, a tension-spring, *n'*, held by a nut, *n*, and a guide-loop for the yarn. The vibration of the arm O is caused by the vibrations of a jointed lever, P, pivoted to a post, *p'*, secured to the base A, said lever being operated by a cam, *g*, on the shaft D. R is a stitch-retainer and cast-off attached to the vibrating-arm O, for the purpose of retaining the stitch upon the stripper until the needle and new stitch have passed through the loop, and then casting it off, which causes the old loop to draw to one side, allowing the needle to come back to its position without interfering with the old loop. On the shaft D is a worm-screw, S, operating a gear-wheel, S¹, which carries a cam, S², by means of which a tilting-lever, T, pivoted to a post on the box C, is operated, the object of which is to change the movement of the needle-disk for knitting various patterns of fabric. For instance, when one point of the cam strikes the tilting-lever T, the opposite end lifts the sliding lever *j*,

causing the needle-disk to reverse and knit one stitch back. Then the cam, releasing the lever, allows the opposite end to drop down again, and drops the sliding lever back to its original position, whereby the needle-disk is again reversed, and allows the machine to knit forward two stitches, when the operation is repeated, producing a twilled knit fabric.

By the employment of different-shaped cams a great variety of knitted fabrics may be produced.

By removing the tilting lever T and placing in its stead a tripping device, U, as seen in Fig. 4, a variety of ribbed work can be produced.

The cam S³ throws out an arm on the tripping device U, which trips a pawl on the jointed lever P, causing the vibrating arm O to remain up until the needle has passed in by the yarn-carrier, whereby said needle does not take the yarn, but in its outward movement the cam having retained the pawl, the vibrating arm O drops down, allowing the needle to pass over the yarn, then the machine knits two stitches when another point of the cam strikes the tripping device, and the operation is repeated.

By employing different-shaped cams for operating the tripper, different varieties of ribbed work may be made, and by the combined operation of both the tripping device and the tilting-lever T, a variety of fancy stitches may be made.

Having described my invention, I claim—

1. The eccentrics D³, pawl-arms G G, pawls *f f*, rocker-arm *h*, fork *i*, sliding lever *j*, and oscillating lever *j*², in combination with the feed-wheel D² for operating the needle-disk, as and for the purpose specified.

2. The combination and arrangement of the bent arm K, oscillating shaft K¹, having an arm, K², the arms L³, pinions *l l* and L¹, and pins L⁴, and connected by the arm L² to the needle-disk for governing the number of stitches to be knit, substantially as described.

3. The vibrating arm O, yarn-carrier N, the sliding rod *m*, and rack *m*², pitman *h*³, arm *h*², the rock-shaft *h*¹, the jointed lever P, and cam *g*, all combined and arranged for operating substantially as specified.

4. The stitch-retainer and cast-off R, for the purpose specified.

5. The combination of the worm-screw S, gear S¹, cam S², tilting lever T, sliding lever *j*, and reversing devices for producing fancy stitches, as specified.

6. The combination of the worm-screw S, gear S¹, cam S², tripping device U, and jointed lever P, with the vibrating arm O and yarn-carrier for producing ribbed work, as specified.

EDWARD P. CURTISS.

Witnesses:

J. C. WAGNER,
WM. WAGNER.