Sheet 1 - 2 Sheets.

R. Cushman.

Stop for Knitting Mach.

No. 12,896. Patented May 22, 1855.

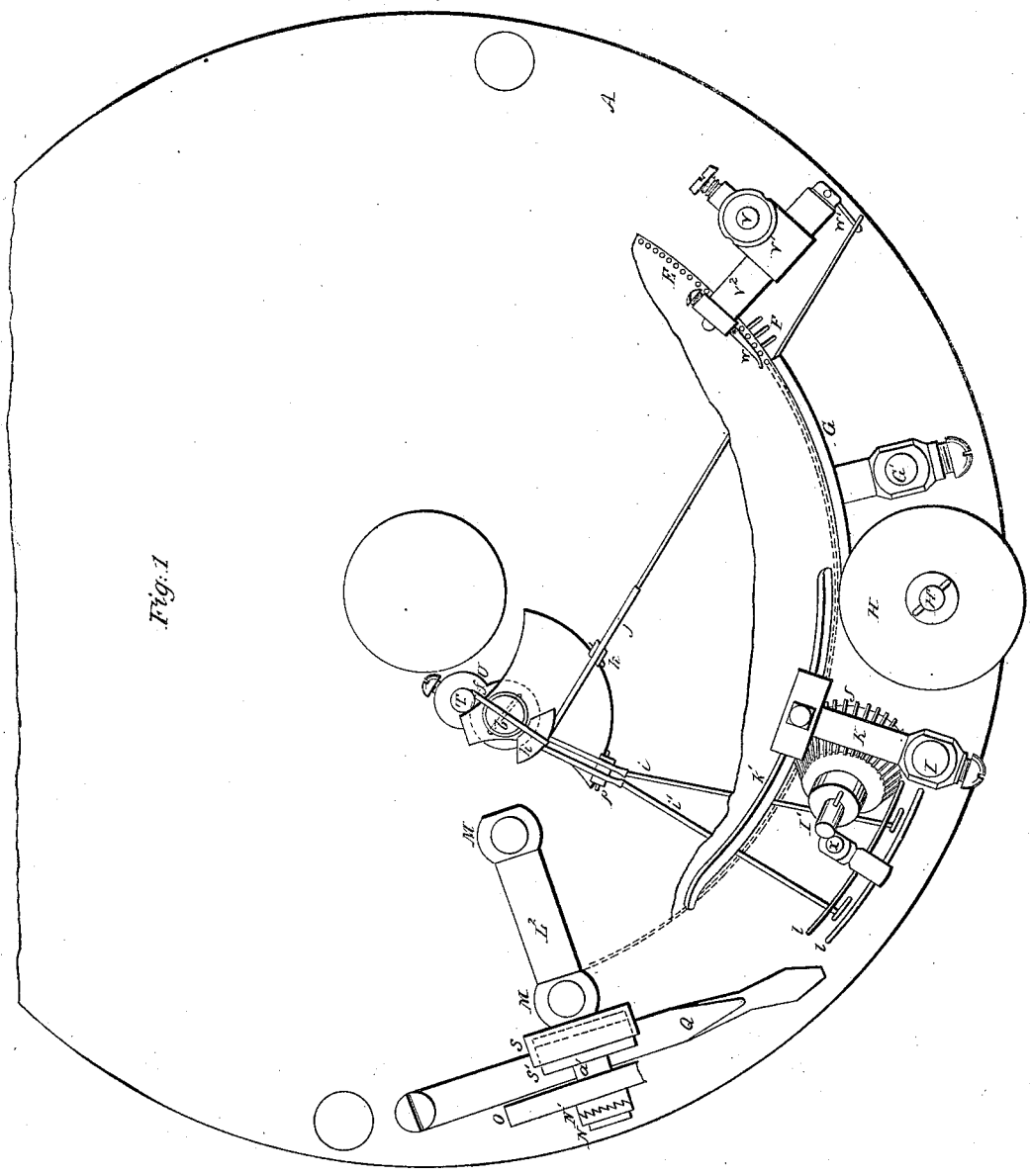

Fig: 1

Sheet 2 - 2 Sheets.

R. Cushman.

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Fig. 3.

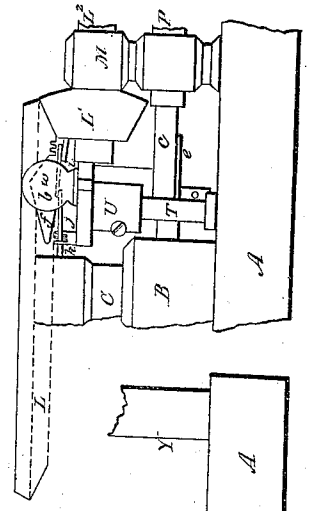
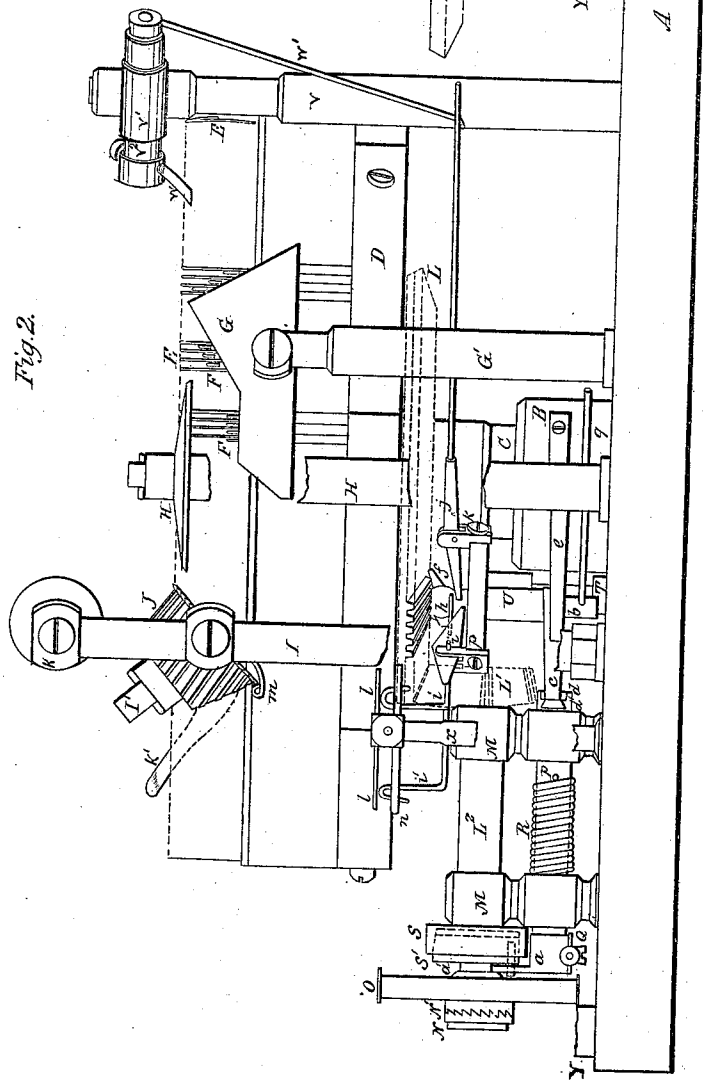


Fig. 2.



UNITED STATES PATENT OFFICE.

ROBERT CUSHMAN, OF PAWTUCKET, RHODE ISLAND.

STEP-MOTION OF KNITTING-MACHINES.

Specification of Letters Patent No. 12,896, dated May 22, 1855.

To all whom it may concern:

Be it known that I, ROBERT CUSHMAN, of Pawtucket, in the county of Providence, and State of Rhode Island, have invented certain new and useful Improvements in Knitting-Machines; and I do hereby declare that the same are described and represented in the following specifications and drawings.

To enable others skilled in the art to make and use my improvements I will proceed to describe their construction and operation referring to the drawings in which the same letters indicate like parts in each of the figures.

Figure 1, is a plan representing such parts of a knitting machine as are necessary to show the construction, use, and operation of my improvements. Fig. 2, is an elevation of the front of the machine with some portions broken away to show others more clearly. Fig. 3, shows a portion of the rear of the machine.

The nature of my improvements consist in an apparatus to stop the machine whenever the fabric produced is not perfect, or not kept properly wound up or drawn from the needles. Also in an improved arrangement and combination of devices to stop the machine instantly when the yarn supplying the machine breaks or runs out.

In the abovementioned drawings A, is a circular base, to which most of the other parts are either attached or fastened provided with a hub B in the center for the stud C upon which stud the needle disk or cylinder D is fitted to turn freely. This disk may be constructed in the common mode of construction for such purposes, or otherwise and furnished with a set of barbed needles E E, and with a set of lifting jacks or levers F F, to press the loops up off of the needles in the operation of knitting. These jacks F F are raised at the proper time by the inclined plane G, which is supported by the stud G′ fastened in the base A. The presser wheel H, is arranged to press the barbs of the needles into the grooves, at the same time that the jacks raise the stitches up over the ends of the barbs, preparatory to their being raised above the ends of the needles. This presser wheel H, turns freely on the top of the stud H′, fastened in the base A. The stud I is also fastened in the base A, and supports the stud I′, upon which the sinker wheel J turns which presses the yarn in between the needles so as to form the stitches as the disk and needles are turned.

The arm K, is fastened upon the top of the stud I, and supports the depressing cam K′, which stands just inside of the needles to depress the fabric and stitches on the needles opposite to the sinker wheel J which forces the yarn in and forms the loops above the stitches in the usual manner.

The gear L, is fastened to the under side of the disk D to turn it, which gear L is acted upon by the pinion L′, on the shaft L^2, which turns in the stands M, M, fastened in the base A. The toothed clutch N is fastened to the outer end of the shaft L^2, and corresponds with the toothed clutch N′, on the pulley O, which is fitted to turn freely on the shaft, when the clutches are separated; to this pulley O, the belt is applied to operate the machine.

The traversing bar P, is fitted to traverse in the stands M, M, (below the shaft L^2) and has the fork *a*, fastened to it which projects into the score *a*′, in the hub of the pulley O, to traverse it when the bar P, is operated by the hand lever Q, to move the pulley and bring the clutches N, and N′, together, so as to set the machine in motion, and it is operated by the spiral spring R, which surrounds it, to move the pulley and separate the clutches to stop the machine. The friction clutch S is fastened to the shaft L^2, and the interior portion S′ is fastened to the fork *a*, so that when the toothed clutches N, N′, are brought together the friction clutch is separated; and when the clutches N, N′, are separated, the friction clutch is pressed together by the spring R, so as to stop the machine instantly.

The stud T is fastened into the base A and supports the stand U which is made in the form represented and supports the rock shaft *b* which is fitted to turn freely in it. The lower end of the rock shaft has the catch *c*, fastened to it, so as to vibrate as the shaft is turned. This catch *c*, catches into a notch *d*, in the end of the bar P, when the clutches N, and N′ are brought together and remains in the notch *d*, while the machine is in motion, being forced against the bar P, by the spring *e*, which is fastened to the hub B as represented. The lever *f*, is fitted to vibrate freely in the upper end of the rock shaft *b*. This lever is provided with a plate *h*, at one end which rests upon the ends of the levers *i*, *i*′, and *j*, so as to be raised by either of them and carry the lever *f*, in between the teeth of the gear L, and turn the rock shaft *b*, so as to release the catch *c*,

from the notch *d*, and allow the spring R, to separate the toothed clutch and bring the friction clutch together and stop the machine instantly.

The post V, is fastened into the base A, and has the stand V′, fastened to it which is provided with a rock shaft V², which is fitted to turn freely and the finger W, fastened to one end, so as to rest upon the fabric knit just within the needles E, E; and if the fabric made, is perfect, it supports the finger; but if the fabric is imperfect, or one or more stitches are dropped, the finger W, catches into the fabric, and is moved by it, so as to turn the shaft V², and vibrate the arm W′. As the weight of said arm causes it to fall from under the lever *j* when the fabric ceases to support the finger W. so as to let the end of the lever *j*, which is held up by it fall, and the opposite end raises the lever *f*, so that it is acted on by the gear L, to turn the shaft *b* and stop the machine as above described. The lever *j* vibrates in the stand *k* fastened to the stand V, for that purpose.

The post X supports the bars *l l* and *n n* between which bars the yarn passes as it enters the machine under the hooks on the outer ends of the levers *i* and *i′* so as to hold them up, so long as the yarn runs in properly; but if one of the yarns breaks or runs out so as to let the hook and lever fall; the opposite end of the lever raises the lever *f*, and brings it in contact with the gear L, so as to stop the machine as heretofore described. The levers *i* and *i′* vibrate in a stand *p* fastened to the stand U. The guide *m*, which conducts the yarn onto the sinker wheel J, is fastened in the stud I′, on which the sinker wheel turns.

The posts Y, Y, fastened in the base A, to support the apparatus which winds up or draws the fabric knit from the needles, are represented as broken off it not being deemed necessary to represent the winding up apparatus.

The lever *q*, in the lower end of the rock shaft *b*, is used to turn the shaft and release the catch *c*, whenever the attendant desires to stop the machine. There is a 2d. notch *d′* in the bar P for the catch *i*. When the catch is in this notch *d′* both clutches are separated so that the cylinder D may be seized by the hand and turned as desired.

Whenever the machine stops from either of the causes mentioned the attendant can supply more yarn or mend the defect in the fabric, and start the machine again after replacing the several parts which were deranged in stopping and if the lever *f*, should not fall clear of the gear L it may be induced to do so by vibrating the lever *q*.

If knitting machines are constructed to knit more than one row of stitches to one revolution I contemplate the application of a finger stop motion, to each apparatus which forms a row of stitches; and also to apply a hook and lever like *i*, or *i′*, to each of the yarns supplied to the machine.

In using some of the knitting machines heretofore constructed if one of the yarns supplied break or run out, it made a thin place in the fabric; if each of the yarns used in making the stitches break or run out and the machine continued to run the stitches would all be thrown off of the needles and the fabric left hanging in the air. Besides I believe there has been no apparatus devised prior to the date of my invention, to cause the machine to stop whenever the fabric produced was not perfect, or not properly wound up or drawn from the needles. Hence it will be apparent that my invention will be of the greatest importance and advantage in making perfect fabrics. Besides this there is another very great advantage in using it with the apparatus which stops the machine instantly, when the yarn supplied breaks or runs out. That is, the perfect fabrics are produced with less than one half the labor heretofore required to produce imperfect ones. In other words one operative can tend two machines with my improvements and knit more than double the quantity and knit it better, with less labor, than he could tend one machine without my improvements.

What I claim as my invention in the above described knitting machine and desire to secure by Letters Patent is,

1. The finger W placed in contact with and resting against the fabric, so arranged that when the fabric is too imperfect to support the finger W it will vibrate and stop the machine substantially in the manner described.

2. I am aware that an apparatus has been applied to knitting machines, to throw off or release the driving power when the yarn supplied to the machine broke or run out, so as to allow the machine to stop. Therefore I do not claim broadly the application of a stop motion for that purpose when used without a friction or other clutch, to stop the machine instantly when the driving power is released, but what I do claim is, the lever *f* actuated by the levers *i* and *i′*, in combination with the rock shaft *b* and the friction clutch S and S′, when arranged and operated substantially in the manner described, so that the instant the thread, or one of the threads break the motion of the machine is arrested.

ROBERT CUSHMAN

Witnesses:
SAMUEL S. MALLERY,
SAMUEL T. MALLERY.