2 Sheets—Sheet 1.

W. AIKEN.

Narrowing Mechanism for Knitting-Machine.

No. 204,648. Patented June 11, 1878.

Fig. 1.

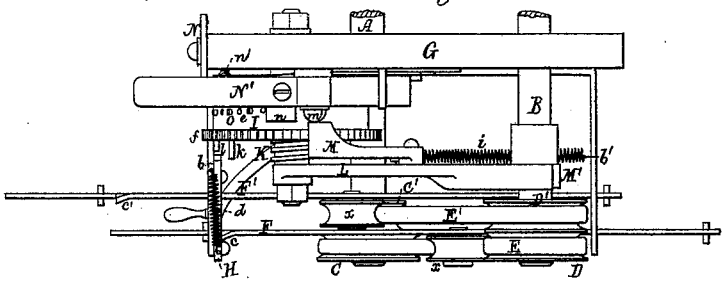

Fig. 2.

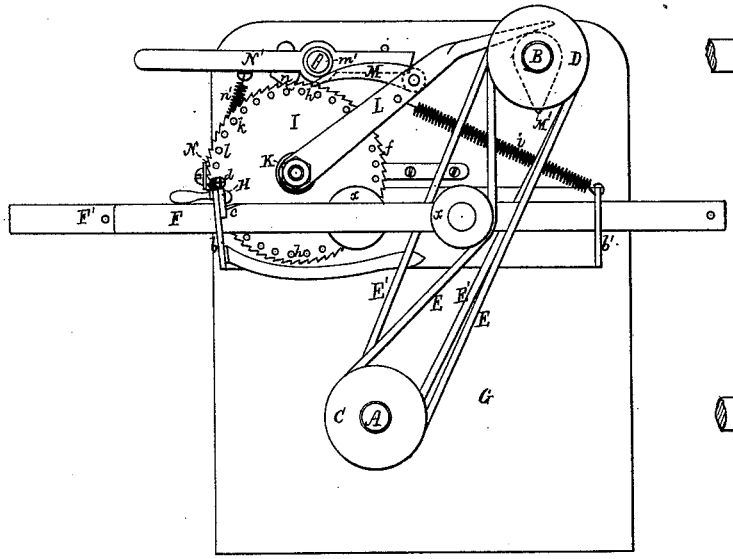

Fig. 3.

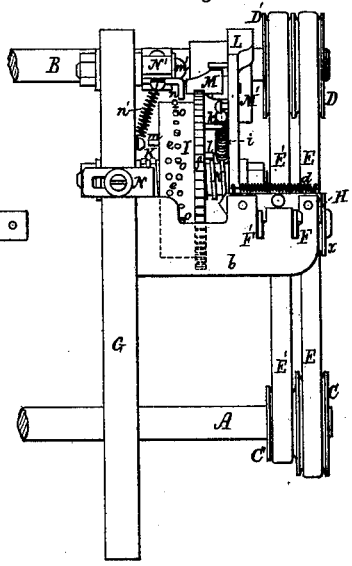

Fig. 5.

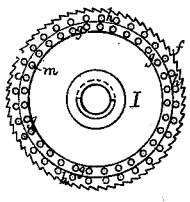

Fig. 4.

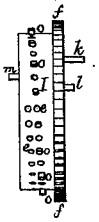

Fig. 6.

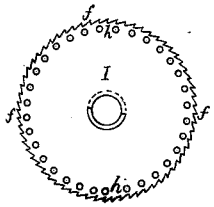

Fig. 7.

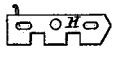

Fig. 8.

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2 Sheets—Sheet 2.

W. AIKEN.

Narrowing Mechanism for Knitting-Machine.

No. 204,648. **Patented June 11, 1878.**

Fig. 10.

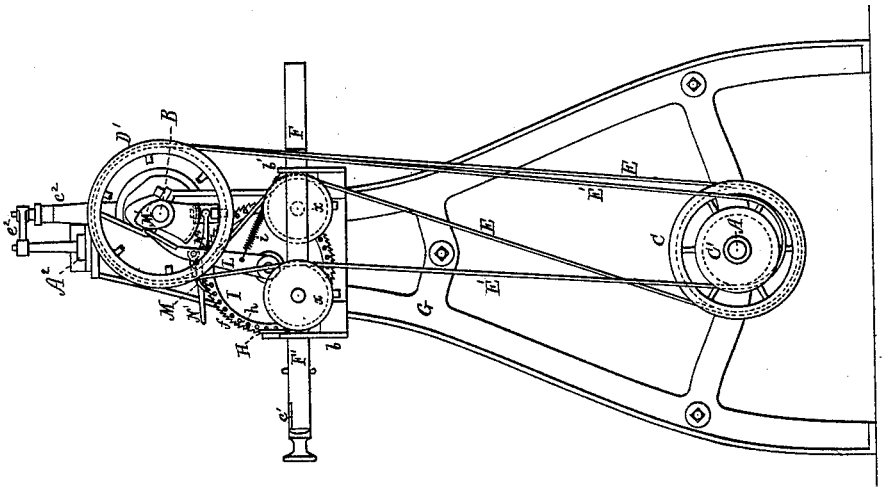
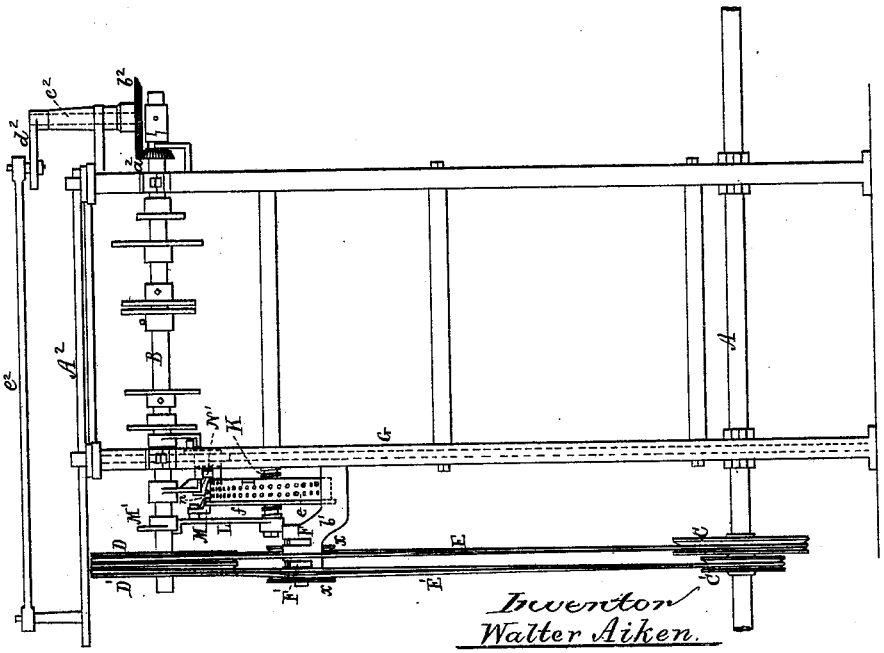


Fig. 9.



Witnesses.
S. N. Piper
John R. Snow.

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by his attorney.
R. K. Eddy

UNITED STATES PATENT OFFICE.

WALTER AIKEN, OF FRANKLIN, NEW HAMPSHIRE.

IMPROVEMENT IN NARROWING MECHANISMS FOR KNITTING-MACHINES.

Specification forming part of Letters Patent No. **204,648**, dated June 11, 1878; application filed March 25, 1878.

To all whom it may concern:

Be it known that I, WALTER AIKEN, of Franklin, of the county of Merrimack, of the State of New Hampshire, have invented a new and useful machine for automatically regulating, in a knitting-machine, the time or periods of narrowing the fabric while being knit; and do hereby declare the same to be described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 is a top view, Fig. 2 a side elevation, and Fig. 3 a rear elevation, of such machine. Fig. 4 is an edge view, and Figs. 5 and 6 opposite side views, of the pin or regulating or pattern wheel, to be hereinafter described.

The machine, which is applicable to what by knitters are termed "straight-knitting machines," or those which knit a web of cloth in contradistinction to such as knit tubular work, automatically determines the times or periods of narrowing, thereby, in order that the fabric, whether it be an undershirt or other garment, may be correctly knit with little or no assistance on the part of an attendant.

In the said drawings, A is the driving-shaft of the machine, such machine being represented as applied to the main shaft B of a knitting-machine of the kind mentioned. On the said driving-shaft two grooved pulleys, C C′, are fixed, the inner one having a diameter less than that of the other. Around such pulleys and two others, D D′, of equal diameters and fixed on the shaft B, two endless belts or bands, E E′, extend.

Two belt-tighteners, F F′, provided, as shown, with grooved wheels *x x*, to bear against the said bands, and arranged as represented, are supported in brackets or projections *b b′* of the frame G, by which the shafts and operative mechanism are sustained. These tighteners are furnished with catches *c c′*, to operate with a movable latch, H, applied to the projection *b*, a side view of such latch being shown in Fig. 7. A spring, *d*, attached to the latch and the part *b*, serves to force the latch into engagement with either of the catches *c c′* when its tightener is pressed back, in order to crowd its grooved wheel against and tighten the endless belt directly in rear of it.

I is the pattern or regulating wheel, it being screwed on a screw-threaded journal, K, projecting from the frame. This wheel has in its rim a helical range of holes, *e e*, corresponding in pitch with that of the threads of the screw in the journal K. Such wheel also has a ratchet-wheel, *f*, fixed to or making part of it, and arranged as represented. On its inner edge the wheel is provided with a row of holes, *g*, and there is a row of holes, *h*, arranged in and around the ratchet-wheel, as shown.

A lever, L, provided with a pawl, M, to engage with the tooth of the ratchet-wheel, is pivoted on the aforesaid journal, and extends over a cam or wiper, M′, fixed on the shaft B, (see Fig. 8,) which is a side view of such cam. A helical spring, *i*, fixed to the lever and end bracket, and arranged as represented, serves to draw the lever downward, in order to retract the pawl on the ratchet-wheel as may be necessary. Furthermore, there is an abutment, N, fixed to the frame, and arranged aside of the regulating-wheel, in manner as shown.

The holes in the ratchet-wheel are to receive pins *k l*, to act against the inner end of the tightener-latch, in order to press such latch backward to release the tighteners, to effect stoppage of the machine.

The pins *k l* may be of any required length, and be inserted in any of the holes of the range, in order to actuate the latch at proper periods, dependent on the number of revolutions or parts of a revolution the wheel may be required to make.

This pattern-wheel, by revolving on a screw while being turned, will gradually approach or recede from the latch. On revolving the wheel back to its starting-point a pin, *m*, inserted in one of the holes in the inner edge of the wheel, will bring up against the abutment and stop the wheel at such point. The series or range of holes enables the stop-pin to be arranged in either of them, as occasion may require.

N′ is a lever, pivoted on a stud or fulcrum, *m′*. A tooth, *n*, extends down from the lever, and engages with a row of pins, *o*, inserted in

the periphery of the pattern-wheel. These pins, as the said wheel revolves, move laterally toward the tooth until one of them may meet and force it and the lever N′ upward, and for a time maintain them so raised. The said lever has vertical movements imparted to it for the purpose of throwing into and out of gear the ordinary narrowing mechanism of the knitting-machine, of which it may form part, or to which it is to be suitably applied. A spring, *n′*, applied to the lever and the frame effects downward movements of the said lever.

The invention is for the purpose of providing a knitting-machine with a regulating stop motion or mechanism, in order to effect the stopping and starting of the narrowing mechanism to bring it into and throw it out of action at the proper times.

The object of employing two tighteners and mechanisms for running the shaft B at different velocities is to enable the knitting-machine to do much more work in a given time, it being caused to run faster when not narrowing the work.

To arrange the regulator for and to put it in action, the lever N′ should first be raised, in order to carry its tooth above the pins of the pattern-wheel, after which such wheel should be revolved backward until the pin *m* projecting from its inner edge may bring up against the abutment N. Next, the outer tightener is to be set or pushed back, and latched. The shaft B will at once be put in revolution, and the pattern-wheel will be intermittently revolved until one of its pins may bring up against and crowd back the latch, which, taking place, the tightener will be moved forward by its belt, and the machine will stop running. Next, the other or inner tightener should be set back, so as to cause the shaft B to revolve at a slower speed. The pattern-wheel again being put in revolution will also be moved laterally, so as to carry the pins in its periphery gradually toward the tooth of the lever over it, until one of them may be brought up against such tooth and force it and the lever upward, so as to throw into operation the mechanism for narrowing. When the narrowing has been carried on sufficiently, a pin in the range of holes in the ratchet-wheel brings up against the latch and moves it, so as to release the tightener, and thereby cause the machine to stop. Should more knitting be required, more pins may be inserted in the ratchet-wheel, and the machine may be started again and stopped at any desired period. As many pins may be put in the ratchet-wheel as the machine may require for being stopped at different times. In knitting fancy or striped work, the machine requires to be stopped for the application of yarns of different colors.

Figs. 9 and 10 exhibit the mode of application of the mechanism to a straight-knitting machine, these figures showing such parts of the knitting-machine with which the additional mechanism is directly connected, Fig. 9 being a rear elevation, and Fig. 10 an end view, of the machine, in part.

In the said figures the parts of the additional mechanism are marked or lettered as they are in the other figures, A being the driving-shaft, and B the cam-shaft, of the knitting-machine, these shafts being also represented in Figs. 2 and 3.

A^2 is the cam-bar for operating the needles, it receiving its reciprocating rectilinear motion from the shaft B by means of the gears a^2 b^2, shaft c^2, crank d^2, and connecting-rod e^2, arranged as shown.

Having thus described my above-mentioned machine, what I claim as of my invention is as follows, viz:

1. The pattern-wheel, as described, having pin-receiving holes, and provided with mechanism for revolving it and for moving it laterally, as specified, in combination with the two shafts A B, their pulleys C C′ D D′ and belts E E′, and the tighteners F F′ and latch H, all being arranged and applied substantially and to operate as set forth.

2. The pattern-wheel, as described, having pin-receiving holes, and provided with mechanism for revolving it and moving it laterally, as specified, in combination with the lever N′, having the tooth *n* and the retractive spring *n′*, and with the two shafts A B, their pulleys C C′ D D′ and belts E E′, and their tighteners F F′, and latch H, all being arranged and applied substantially and to operate as set forth.

3. The combination of the pattern-wheel, perforated as described, and provided with mechanism for revolving it and moving it laterally, as specified, with the abutment N, and with the two shafts A B, their pulleys C C′ D D′ and belts E E′, and the tighteners F F′ and latch H, all being essentially as specified.

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Witnesses:
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JOHN R. SNOW.