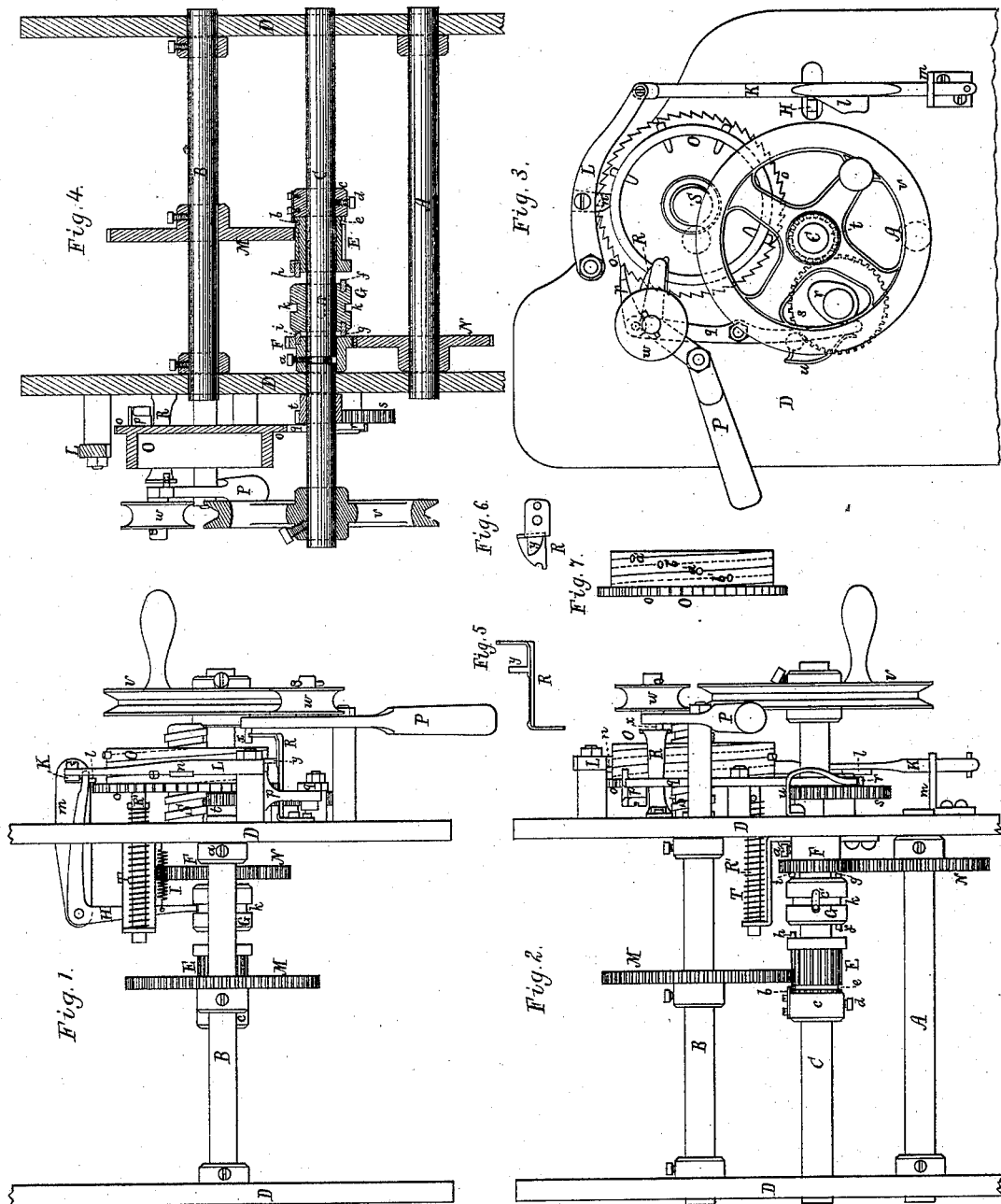


W. AIKEN.  
Knitting-Machine.

No. 216,125.

Patented June 3, 1879.



Witnesses  
J. N. Piper.  
J. F. Duvick

Inventor  
Walter Aiken  
by attorney.  
R. H. Eddy

# UNITED STATES PATENT OFFICE.

WALTER AIKEN, OF FRANKLIN, NEW HAMPSHIRE.

## IMPROVEMENT IN KNITTING-MACHINES.

Specification forming part of Letters Patent No. **216,125**, dated June 3, 1879; application filed January 17, 1879.

*To all whom it may concern:*

Be it known that I, WALTER AIKEN, of Franklin, of the county of Merrimac and State of New Hampshire, have invented a new and useful Improvement in Knitting-Machines for Making Shaped Goods, consisting mainly in mechanism for alternately revolving at different speeds the driving-shafts of the knitting and narrowing mechanisms; and I 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 front elevation, Fig. 3 an end view, and Fig. 4 a vertical and longitudinal section, of mechanism constituting my invention, and that with which it is combined and by which it is put in operation.

The nature of my invention will be understood by reference to the claim or claims hereinafter made.

In such drawings, A denotes the driving-shaft of the knitting, and B that of the narrowing mechanism of a straight narrowing knitting machine for making shaped work, one of such shafts being arranged over the other, and there being another shaft, C, disposed between them, such shafts being suitably supported in a frame, D.

There are on the shaft C two loose gears, E F, the latter of such gears being provided with a set-screw, *a*, for tightening it to its shaft, as occasion may require, although when a fabric to be narrowed is being knit the gear F is to turn loosely on the shaft. The gear E is grooved in its periphery to receive a hooked finger, *b*, extending from a collar, *c*, that encompasses the shaft C, and is fixed in place thereon by a set-screw, *d*, screwed into the said collar and against the shaft.

The object of the adjustable collar and its finger and set-screw is to effect the adjustment of the loose gear on the shaft, and with the groove *e* of such gear to maintain the gear in its proper position relatively to a clutch, G, arranged on the shaft C and between the said two loose gears. This clutch has studs *f g* projecting from its opposite ends, they being to engage with similar studs *h i* extending from the next adjacent ends of the loose gears. The clutch slides endwise on the shaft C, but should

be kept from revolving thereon by a feather-connection, *e'*, or its equivalent. The clutch, at its middle, has a groove, *k*, made in and around it to receive one arm of a bent lever, H, arranged as shown, and provided with a spring, I, to force its other arm against a cam, *l*, projecting from a rod, K, depending from a lever, L, and adapted to slide vertically in a bracket, *m*.

The loose gear E engages with a larger gear, M, fixed on the upper of the two shafts A B—viz., that marked B, which drives the narrowing mechanism. The gear F also engages with a gear, N, fixed on the shaft A.

There is projected from the lever L a tooth or cam, *n*, to co-operate with one helical row of the studs of the periphery of a pattern-wheel, O, that is screwed and revolved on a stationary screw, S, and is provided with a ratchet-wheel, *o*. A pawl, *p*, pivoted to a lever, *q*, engages with the said ratchet-wheel. The said lever, arranged as shown, is worked in one direction by a cam, *r*, fixed to the side of a gear, *s*, that engages with a pinion, *t*, fixed on the shaft C. A spring, *u*, arranged as shown, presses the lever up to the cam.

Furthermore, there is fixed on the shaft C a driving-pulley, *v*, over which is a belt-tightener or pulley, *w*, which is pivoted to one arm of a lever, P, whose other arm is weighted or has a weight greater than that of the fellow-arm and its grooved wheel. A stud, *x*, projects from this latter arm and engages with a notched spring-latch, R, which is fastened to the frame, and arranged with the pattern-wheel in manner as represented. A top view of the said latch is given in Fig. 5, and a rear end view of it in Fig. 6. It has a small angular cam, *y*, extending from it to operate with the other helical row of studs of the pattern-wheel. At the proper time for stoppage of the machine—that is, when the pattern-wheel may have moved sufficiently on its supporting-screw—a stud of the pattern-wheel will be forced against the cam *y*, so as to cause the latch to be disengaged from the belt-tightener lever, whose preponderating arm will next or immediately drop down, and thereby cause the band-tightening wheel to be raised off the endless band which may be driving the pulley *v*, fixed on the end of the shaft C.

The pattern-wheel O hereinbefore mentioned, but which I do not claim, differs somewhat in construction and mode of operation from any of those shown in patents heretofore granted to me. Instead of being provided with a circular row of holes in its sides to receive pins or a series of studs projecting from such side of it, and also with a single helical row of pins or studs extending from its periphery, the first row of studs being for use in operating the stop-motion latch or the belt-tightener, the present wheel has in its periphery two helical rows of holes for studs, those of one of such rows being to actuate the latch R, and those of the other the lever L. Each row of holes and its studs are in a helix, the distance between the ends of each turn of which equals that between the ends of a turn of the helix of the screw-thread on which the wheel revolves. The two helical rows of studs, however, are but half that distance apart from each other at their medial lines, and are arranged around the periphery of the wheel like the threads of a double-threaded screw about their cylinder. The studs of one helical row act in succession against the cam or tooth *n* of the lever L, and, as the wheel revolves, pass without coming into contact with the tooth or cam *y* of the latch R. The studs of the other helical row as the wheel revolves act in succession against the said cam *y*, and pass the cam *n* without touching it.

Fig. 7 is a top view of the wheel O, it showing the arrangement of the helices of the two rows of stud-receiving holes *a'* *b'*, one helix being represented in full lines and the other in dotted lines.

In a full-sized working-machine there are from two hundred to five hundred stud-holes in each helix, and the studs are inserted therein in such number and in such holes as circumstances may require.

I make no claim to the invention of this construction of the knitting-machine pattern-wheel. Each upward movement of the lever L causes the clutch to be moved into engagement with the loose gear E, the opposite movement of the clutch—that is, its movement into

engagement with the gear F—being effected by the retractive power of the spring I.

A slide pin or brake, R', is forced endwise against the pattern-wheel by a spring, T, such being to keep the wheel from being moved too far by each advance of its operative pawl.

I claim as my invention as follows, viz:

1. The combination consisting of the driving-shaft C, the fast gears M N, the loose gears E F, the double clutch G and its operative lever H, spring I, cammed rod K, cammed lever L, and pattern-wheel O, all arranged and applied for the purpose of revolving the two shafts A B alternately at different speeds, essentially as specified.

2. The belt-tightener wheel, weighted lever P, provided with the stud X, in combination with the spring-latch R, having the cam *y* and pattern-wheel O, substantially as set forth.

3. The combination of the adjustable collar *c*, its set-screw *d*, and hooked finger *b* with the shaft C, the grooved loose gear E, the clutch G, operated, as described, by wheel O, lever L, cammed rod K, and bent lever H, the loose gear F, and the fast gears M and N of the shafts A and B, substantially as specified.

4. The loose gear F, provided with the set-screw *a*, in combination with the shaft C, clutch G, with its described operating mechanism, and the loose gear E, the fast gears M N, and their shafts A B, all being substantially as represented.

5. The knitting-machine pattern-wheel O, operated by the described operating mechanism and provided with the two helical rows of stud-receiving holes and studs therefor, arranged in its periphery and with respect to each other and the helix or pitch of the thread of its supporting-screw, as described, in combination with the supporting-screw S, clutch G, stop-motion tooth-latch R, and the toothed lever L, of the mechanism for operating the clutch G, as described.

WALTER AIKEN.

Witnesses:

ALEXIS PROCTOR,  
PARKER C. HANCOCK.