H. W. THURSTON.
Netting-Machine.

No. 202,386. Patented April 16, 1878.

Fig. 1

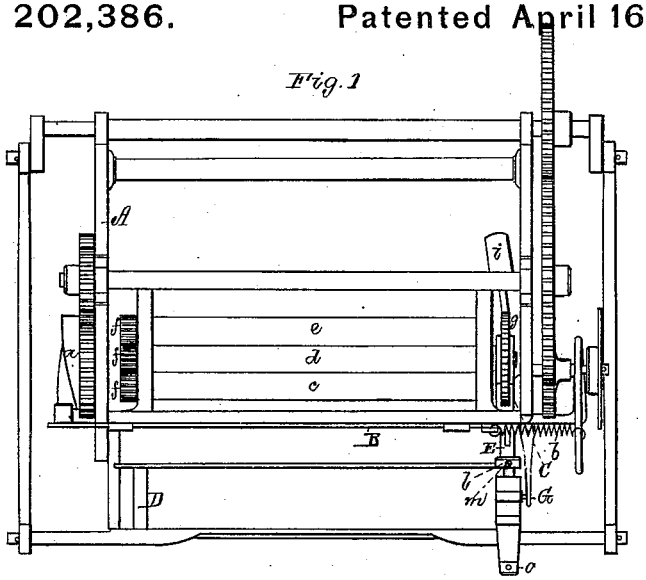



Fig 2.

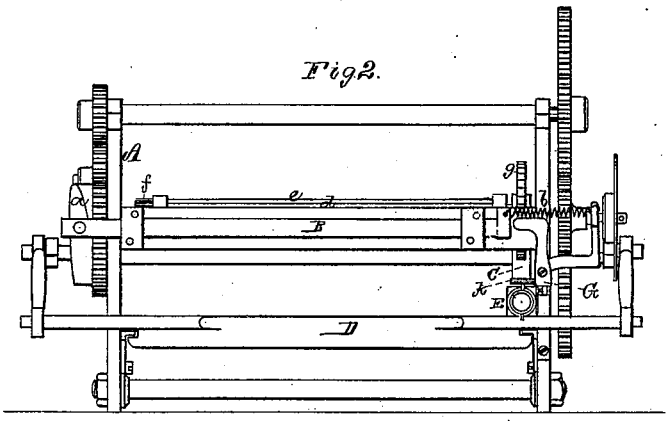



Fig 3.

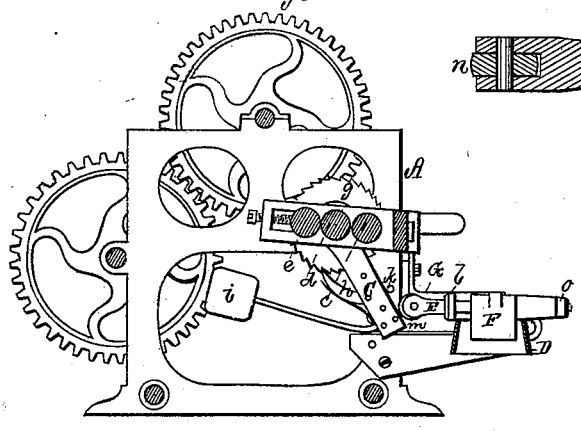



Fig 4.

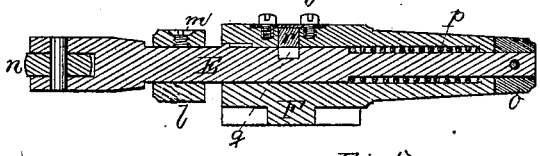
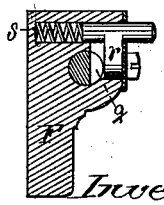



Fig 5.




Witnesses.
S. N. Pipin
L. M. Willard

Inventor
Henry W. Thurston.
by his attorney
R. H. Eddy

# UNITED STATES PATENT OFFICE.

HENRY W. THURSTON, OF CAMBRIDGE, ASSIGNOR TO JOHN W. FAIRBANKS, OF WALTHAM, MASSACHUSETTS.

## IMPROVEMENT IN NETTING-MACHINES.

Specification forming part of Letters Patent No. **202,386**, dated April 16, 1878; application filed December 11, 1877.

*To all whom it may concern:*

Be it known that I, HENRY W. THURSTON, of Cambridge, of the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Netting-Machines; and do hereby declare the same to be described in the following specification and represented in the accompanying drawings, of which—

Figure 1 denotes a top view, Fig. 2 a front elevation, and Fig. 3 a transverse section, of my invention, and the parts of a netting-machine with which it is connected and operates. Fig. 4 is a horizontal section, and Fig. 5 a transverse section, of the movable tappet, its bracket, and battery mechanism, to be hereinafter described.

The invention relates to a netting-machine of the kind described in the United States Patent No. 43,888, dated August 16, 1864, and is for the purpose of equalizing the four sides of each mesh of a net while being made by such machine.

One great difficulty with the said machine and others of like character has been that in weaving a piece of netting each of its meshes would not have its boundary-threads equal in length, two of them being a little shorter than the other pair, the result being that when the net is in use the strain on it is borne mostly, if not entirely, by the shorter twines of the meshes, and as a consequence the net is rendered less enduring, or more liable to be ruptured, than would be the case were the twines of each mesh of equal length. This inequality in the lengths of the sides of each mesh is due to the twines of the spools being subjected to inequality of tension induced by the unequal movements of the comb or slide-bar. The twines run across the bar, and between pins, or studs extending out from it, in a manner well known.

In the drawings, A denotes the frame of a netting-machine; B, the said slide-bar or movable comb, its teeth not being shown. The cam for moving the bar B in one direction longitudinally of it is seen at *a*, the spring for moving it the opposite way being represented at *b*. This cam is or should be constructed so as to produce variable advance movements of the bar, or, in other words, the usual positive, alternate long and short movements of it. The take-up rollers are shown at *c d e*, their connecting-gears at *f f f*, and operative ratchet-wheel at *g*. The swinging arm or lever which carries the impelling-pawl *h* of the ratchet is shown at C, it being provided with a weighted arm, *i*, for forcing it backward against a stop, *k*, all of which is common to the said netting-machine, which, as heretofore constructed, had extending from its shuttle-carriage an adjustable tappet, which, during the inward movement of the carriage, was forced against the pawl-carrying lever, and moved it forward on its fulcrum, so as to cause the ratchet-wheel to be partially revolved. Although by setting the tappet either backward or forward the throw of the lever would be increased or diminished to vary the motion of the take-up rollers, and thereby produce a corresponding change in the length of mesh, yet in making a net the throw of the lever remained the same while weaving a net of any one size of mesh.

By my invention the throw of the pawl-lever is less in every other forward movement of the shuttle-carriage than it is in the preceding forward movement of such carriage, such causing the take-up rolls to advance the net, so as to make each of its meshes with sides or twines of equal length.

My invention, therefore, virtually consists in a netting-machine, substantially as mentioned, having mechanism for varying the feed or take-up of the net, in order to cause the four sides of each mesh to be equal in length.

In the drawings the shuttle-carriage is shown at D, but without the shuttles.

In carrying out my invention I apply or fix a bracket, F, to such carriage, and arrange in such bracket a sliding tappet, E, provided with an adjustable collar, *l*, which slides lengthwise on the shank of the tappet, and has a set-screw, *m*, for fixing it thereto. I usually provide the tappet at its front end or part with a friction-wheel, *n*, to work against the pawl-lever. At its rear end the tappet is furnished with a shoulder or stop-collar, *o*, by

which the extent of forward movement of the tappet in the supporting-bracket F is determined. Within the bracket, and encompassing the shank of the tappet, is a helical spring, *p*, for moving the tappet forward in the bracket.

The tappet has a notch, *q*, in it to receive a bolt, *r*, arranged in the bracket, and provided with a spring, *s*, for moving it (the said bolt) out of the notch. This bolt extends from the bracket toward a bent lever, G, pivoted to the frame, and having its lower arm bent horizontally, as represented. The upper arm of the lever G abuts against the end of the comb or slide-bar B.

As the slide-bar B has positive alternate long and short movements with reference to the lever G, the said lever in each of the longer movements of the bar will be moved on its fulcrum, so as to move its lower arm inward toward the bolt *r*, and cause such bolt to be forced into the notch of the tappet, and thereby to lock the tappet in its advanced position in its bracket.

In the next advance of the shuttle-carriage, the tappet, by projecting farther forward than it previously did, will effect a greater movement of the pawl-lever, and thereby vary the take-up of the net. On retreat of the slide-bar, the lever G will be relieved of its pressure, and will allow the spring of the bolt to operate to move such bolt out of engagement with the tappet, which, during the next succeeding advance of the shuttle-carriage, will slide back in the bracket until the collar *l* may bring up against the bracket, from which it will be seen that, as the carriage may continue to advance, the movement of the pawl-lever will be less than it was during the previous advance of the carriage.

This variation in the take-up, or advance of the net or work, when properly conducted, will cause each of the meshes to be woven with its four sides equal in length.

I claim—

1. In a netting-machine, in combination with its reciprocating shuttle-carriage, and with the take-up rollers and their operative mechanism, as described, (viz., their connecting-gears, pawl-lever, pawl, and weighted arm,) and with the comb-bar and its mechanism for imparting to it variable movements, as set forth, the mechanism for varying the taking up or feeding of the net, so as to cause the four sides of each mesh thereof to be equal in length on its production such mechanism for such purpose applied to the frame and the shuttle-carriage, and to operate with the comb-bar, substantially as explained, being the bracket F, bent lever G, notched tappet E, stops *l o*, spring *p*, and the bolt *r* and its operative spring *s*, arranged and applied essentially as set forth.

2. The combination of the bracket F, lever G, sliding and notched tappet E, stops *l o*, spring *p*, bolt *r*, and the operative spring *s* of such bolt, all being arranged essentially as set forth.

HENRY W. THURSTON.

Witnesses:
R. H. EDDY,
JOHN R. SNOW.