

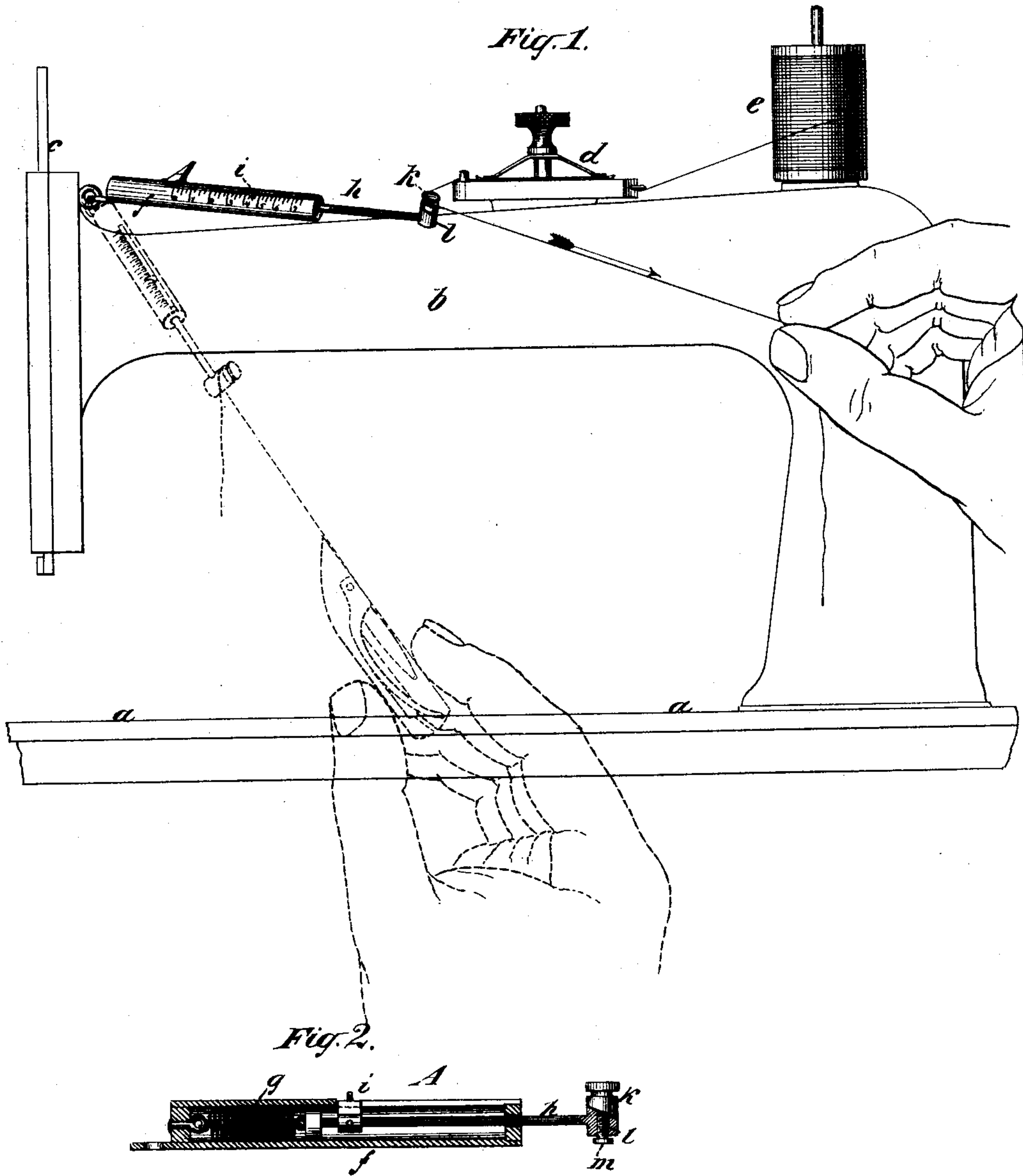
(No Model.)

A. A. STURTEVANT.

SEWING MACHINE.

No. 326,067.

Patented Sept. 8, 1885.



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SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 326,067, dated September 8, 1885.

Application filed July 1, 1884. (No model.)

To all whom it may concern:

Be it known that I, ALBERT A. STURTEVANT, of Hartford, Hartford county, Connecticut, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

My invention relates solely to the regulation of the tension of both the upper and lower threads of sewing-machines, and aims to provide a simple means whereby the tension of either thread may be adjusted to the proper degree to produce a perfect stitch on any kind of goods which are to be operated upon.

To this end the main feature of my invention consists in the combination, with the sewing-machine, of a small scale graduated into degrees representing the different degrees of tension between minimum and maximum required for different stitches or kinds of work, whereby the proper tension may be weighed and the tension devices of upper and lower threads set accordingly. This scale is preferably a simple spring-scale, having its barrel or case pivoted at one end to the front end of the arm of the machine, and arranged to swing into either a horizontal or vertical position, with a knob, hook, or roller on the end of the weighing or movable spring-rod of the scale, around which the spool-thread may be passed in a loop to test the tension. The spring-rod is also provided with a cam or screw-clamp by which the shuttle-threads may be gripped without the necessity of tying a knot when it is desired to test and regulate the tension on the shuttle-thread. My invention, therefore, consists in the features above outlined, as hereinafter fully set forth.

In the drawings annexed, Figure 1 presents a side elevation of an ordinary sewing-machine provided with my tension-regulating device. Fig. 2 presents a longitudinal section of the tension-regulating scale, to illustrate more particularly the thread-gripping device on the spring-rod.

In Fig. 1, *a* indicates the base or work plate of the sewing-machine, and *b* the overhanging arm thereof; *c*, the needle-bar; *d*, the clamp or "tension" for the upper thread, and *e* the spool from which the thread passes the tension-clamp *d* to the needle-bar and needle, as usual.

In the operation of sewing-machines, as is well known, different kinds of goods and dif-

ferent lengths of stitches require different adjustments of the tensions in order to produce a stitch of proper tightness and appearance upon the goods; and in order to accomplish this properly the tensions of both the spool and shuttle threads must be correct relatively to each other. This is generally accomplished by experiment by tightening or loosening the tension-clamp *d* for the upper thread, and reducing or increasing the tension on the shuttle-thread, and then trying the adjustment by sewing a few stitches, which tests have often to be repeatedly made before the proper stitch is produced. This is particularly difficult to novices, who seldom produce a correct stitch, and is also troublesome to adepts, particularly the matter of the relative adjustments of the two tensions, for the reason that there is no means provided in present machines to indicate when the shuttle-thread is at the same tension as the needle-thread, or at the proper relative tension, except the experimental test of the stitch itself, which is objectionable by reason of being imperfect and of causing delay and annoyance.

In order to obviate these objections, therefore, I provide the machine with a small weighing-scale, *A*, preferably a simple spring-scale, whose range or index is graduated into degrees representing degrees of thread-tension suited to any class of goods or kind of stitch from minimum to maximum, and by which the tension of either thread may be easily weighed or regulated and both tensions made absolutely alike or at any proper relative degree, as will be readily understood, thus effecting a most desirable improvement in the management of sewing-machines. The scale *A* embodies the usual elements of a spring-scale—viz., the barrel *f*, spring *g*, and spring rod or plunger *h*, the spring *g* being fixed at one end to the barrel and at the opposite end to the rod *h*, as usual. The side of the tube *f* is slotted, and is graduated into fine lettered or numbered divisions along the length of the slot, forming a scale of weights or strains, and an index-point, *i*, projects from the rod *h* through the slot and moves over the said graduations.

The spring *g* is of course a light or delicate one, its tension, when at its maximum stretch, not exceeding the maximum tension to be put upon the thread, as will be understood; and

the graduations on the tube from zero to the maximum represent successive degrees of tension which may be put upon the threads suitable for various kinds of work, as will be readily comprehended.

On the free end of the rod *h* is fixed a little cylindrical block, *l*, having a beveled or oblique face, on which is mounted a little round knob, *k*, having a beveled base to correspond with the bevel on the block *l*, as shown best in Fig. 2, and a central stem, *k'*, which passes through a central perforation in the block *l*, and whose end is riveted beyond the block to prevent the separation of the parts and allow only a limited play of the knob on the seat or block *l*, as will be understood. The knob *k* has a knurled rim, by which it may be easily turned by the fingers, and it has also a circumferential groove below the rim, as best shown in Fig. 2.

The scale thus formed is preferably hung to the arm of the machine in a convenient position to test the tension of either thread, preferably at the top and front end of the arm, as shown in Fig. 1, an eye on the end of the tube *f* being hinged to an eye on the arm, or otherwise pivoted, so that the scale can hang down vertically or be swung up into a horizontal position near to the tension-clamp *d*, as shown by full and dotted lines in Fig. 1.

Now, in order to regulate and test the tension of the upper thread, it is only necessary to swing up the scale *A* into a horizontal position in line with the tension-clamp *d*, and then pass the thread as it issues from the clamp *d* around the grooved part of the knob *k*, holding the end of the thread in the fingers of one hand and pulling lightly thereon, as illustrated, while the other hand gradually tightens or loosens the clamp until the index-point of the scale stands at the degree required, with the thread just slipping through the clamp, when the clamp *d* will then be set at the proper tension. After this is done the thread can be unlooped from the knob of the scale and the scale allowed to hang down in its free vertical position, and the thread can then be threaded through the needle-bar and needle ready for sewing. The tension of the shuttle-thread can now be set by passing the end of the thread between the beveled faces of block *k* and knob *l* and then turning the knob, which will cause the beveled face of the knob to be forced against the face of the block *k*, and thus firmly clamp the thread between them with a wedging cam or screw action, as will be understood. The shuttle is then pulled outward or downward, as shown by dotted lines in Fig. 1, until the thread slips through the tension-holes or other tension devices of the shuttle, and the degree at which the index of the scale stands is noted. If this degree is not the same as that to which the upper tension is set, then the tension on the shuttle is altered until the scale shows the same degree, or whatever other degree is relatively correct for the shuttle, as will be understood, after which the thread is freed

from the clamp on the scale by turning the knob *k* in the opposite direction, and the shuttle may now be put in the machine and the sewing commenced without further trials.

When the needle-thread is tested, as shown by full lines in Fig. 1, the scale will show twice the tension that is actually on the thread on account of the compound-pulley arrangement of said thread, whereas when the shuttle-thread is tested, as shown in dotted lines, the scale will show the exact tension on the thread on account of its direct connection with the scale, so that in case it is desired to have the tension on both threads equal, the strain indicated for the needle-thread must be twice that of the shuttle-thread; but in case it is desired to have the strain on the shuttle-thread twice that of the needle-thread the strain indicated by the scale should be alike in both cases.

Hence by this simple device the tensions of both threads can always be accurately adjusted and set absolutely correct relatively without any guess-work or experiment, and without the usual delay, trouble, and annoyance, and therefore a perfect stitch can be readily produced on work of all kinds by novices or adepts, which is a most desirable feature in the working of sewing-machines.

It will of course be understood that when machines are provided with my device accurate tables will be prepared by careful tests showing the proper degrees of tension for different designated kinds of work, so that all the operator will have to do will be to refer to the table and adjust the tensions to said degrees, which can be accurately done by means of the scale in the manner already described, as will be easily comprehended. Furthermore, if the operator has any particular kind of work to perform, and once finds the proper degree of tension therefor, she can readily set the machine to the same tension at any time thereafter, when the same work is to be done again, thus securing perfect accuracy in work under all conditions, and rendering the regulation of the machine in one of its most important features easy and convenient.

If desired, a scale acting by a weight might be substituted for the spring-scale; but the latter is considered much the best. I do not limit myself to the location of the scale on the machine in the exact position shown, but consider that the most advantageous.

I am aware that it is not new to employ a small scale to test the tension of sewing-machine threads, as shown in the Patent No. 42,801, of 1864; but my invention is distinct in the manner of connecting the scale with the sewing-machine, and in the construction of the scale to hold either shuttle or needle thread, as hereinafter claimed.

What I claim is—

1. The combination, with a sewing-machine, of the spring-scale *A*, having its fixed part attached to the machine, and provided with

graduations representing degrees of thread-tension, with a positive friction-clamp on its movable part to hold the thread, substantially as set forth.

- 5 2. In combination with a sewing-machine, the thread-tension scale A graduated with divisions representing degrees of thread-tension, and provided with the beveled clamp-

seat 7, in combination with the rotary beveled clamp-knob 7, substantially as and for the purpose set forth.

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