I. M. SINGER.

Sewing Machine.

No. 14,475. Patented March 18, 1856.

Fig 1

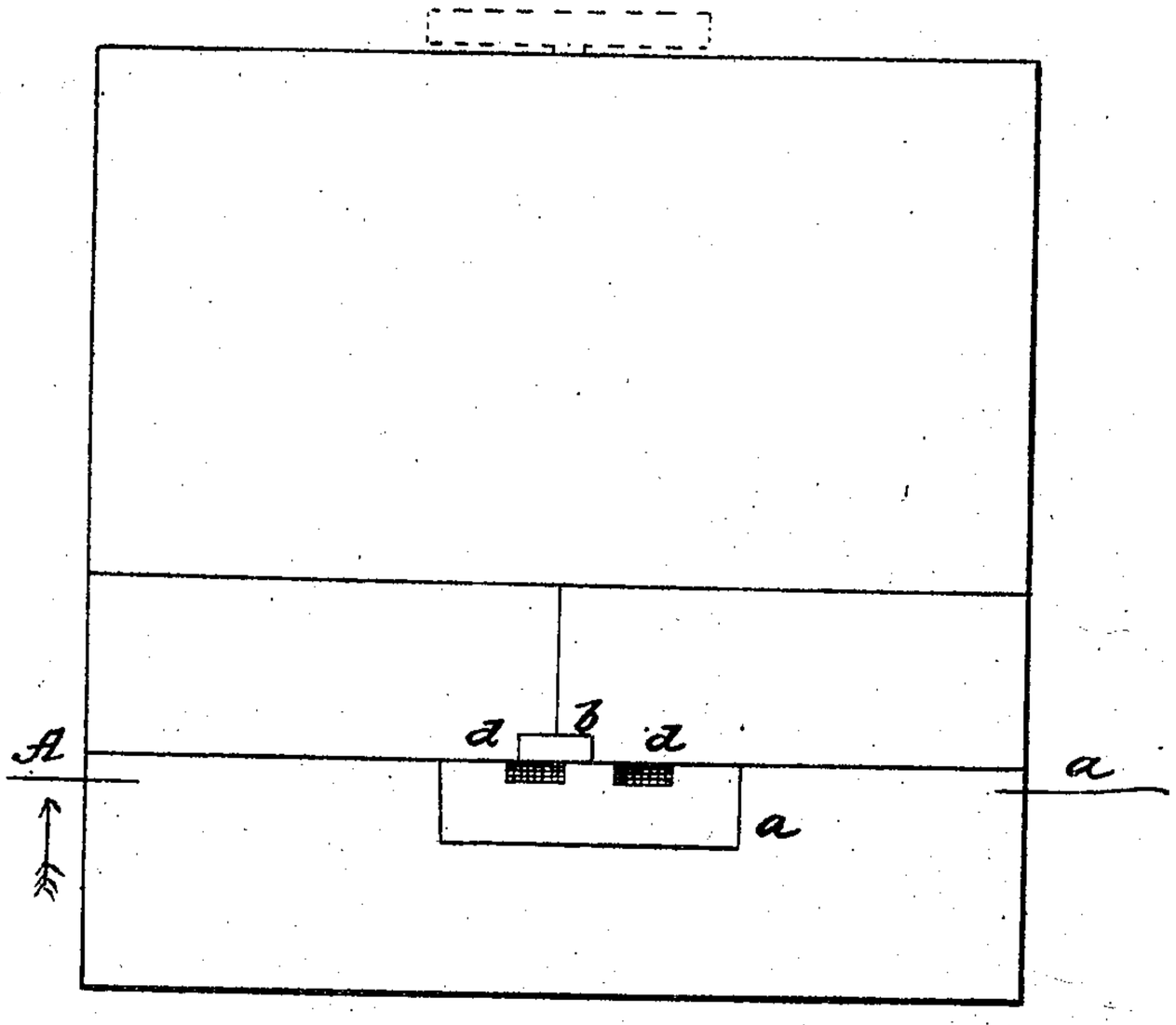
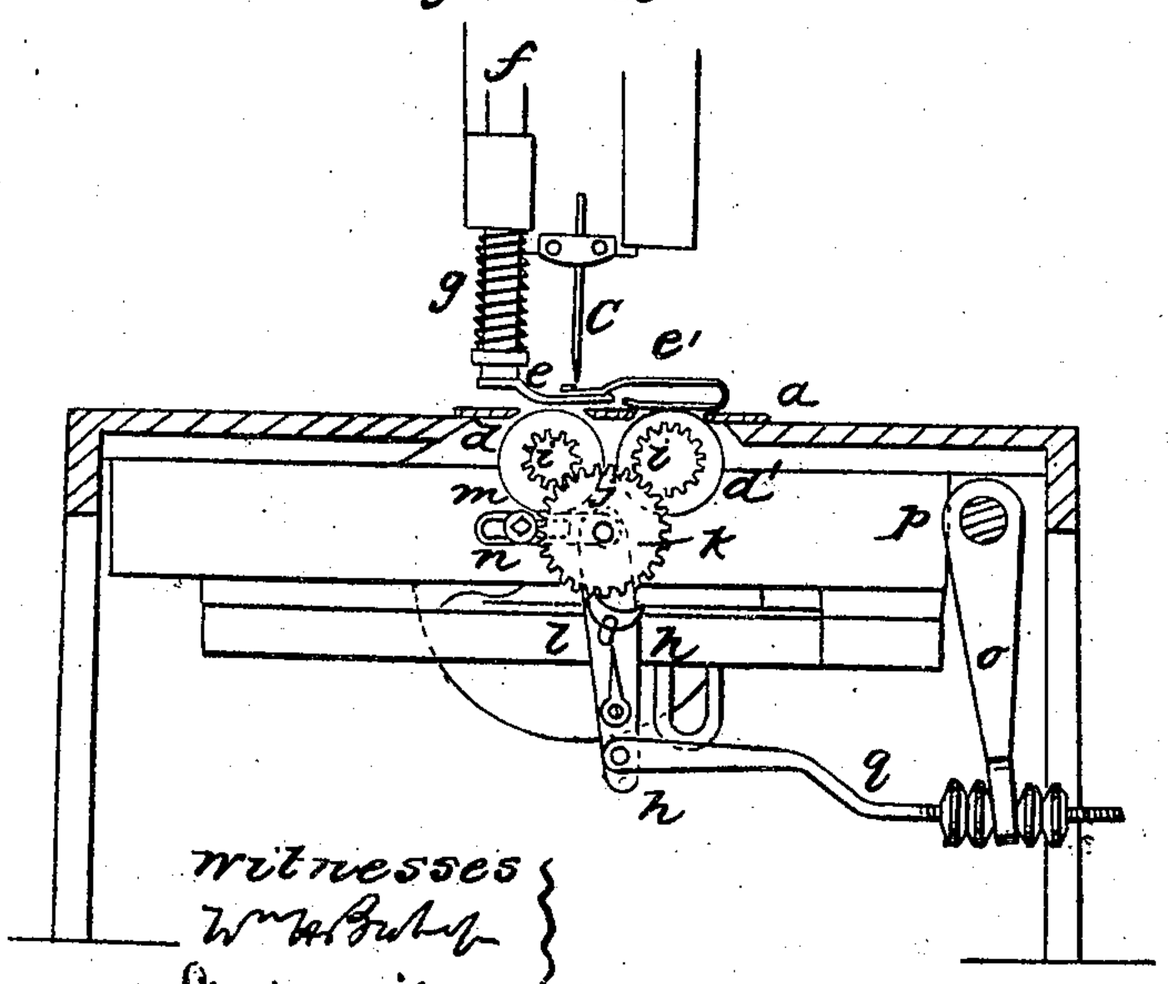



Fig. 2 A. a

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# UNITED STATES PATENT OFFICE.

ISAAC M. SINGER, OF NEW YORK, N. Y.

## IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **14,475**, dated March 18, 1856.

*To all whom it may concern:*

Be it known that I, ISAAC M. SINGER, of the city, county, and State of New York, have invented a new and useful Improvement in the Sewing-Machine, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a horizontal section of the machine, taken in the plane just above the table or bench on which the material to be sewed is placed; and Fig. 2, a vertical section taken at the line A *a* of Fig. 1.

The same letters indicate like parts in both the figures.

My invention relates to an improvement in the feeding-motion of sewing-machines, by which the cloth or other substance to be sewed is held in a distended condition or in a crimped condition while being sewed, so that when sewed it may be stretched without straining the seam, or by which the material can be made shorter by the seam or "gathered up," as it is sometimes technically termed; and to this end my said invention consists in combining in one sewing-machine two feeding-wheels or equivalents therefor moving with differential velocities—that is, the one forward of the needle moving faster over a greater space or slower over a less space than the one back of the needle—that is, the forward one moving faster or slower than the rear one, so that the cloth or other substance to be sewed shall be distended or gathered or puckered up where the seam is being formed.

The accompanying drawings represent so much of one of the well-known sewing-machines as is deemed necessary to a clear comprehension of my said improvement; and in the said drawings *a* represents the table on which the cloth to be sewed is placed, with the usual aperture, *b*, in which the eye-pointed needle *c* works to penetrate the cloth and form the stitches, whether in connection with a shuttle or any of the known instruments for that purpose. The machine is also provided with the usual feeding-wheel, *d*, and pressure-pad *e* on the lower end of a sliding bar, *f*, which is forced down by a spring, *g*, to press the cloth onto the periphery of the feed-wheel. All these parts, together with the mechanism for operating the needle, the shuttle, or other concatenating instrument, and for operating the lever *h*, which communicates the intermittent feeding motion to the feed-wheel, are well known and do not require to be described, as they may be constructed in any suitable manner known to persons skilled in sewing-machines; but the vertical plane of the axis of the feeding-wheel *d* should be placed forward of the needle; and back of the needle there is a second feeding-wheel, *d'*, constructed and mounted in the same manner as the other, and to the pressure-pad *e* is attached a spring-pad, *e'*, which extends over the second feed-wheel, *d'*, to press the cloth onto the periphery thereof, so that the cloth or other substance to be sewed is gripped and held by the two feed-wheels and pressure-pads, one forward and the other back of the needle, and as the second pressure-pad, *e'*, is in itself a spring, either of the pads can yield independently of the other to adapt themselves to varying thicknesses of cloth or other substance. Now, as the object is either to distend or pucker up the cloth between the two feeding-wheels, so that after the seam has been completed in the former case the cloth may be stretched without straining the thread or threads forming the seam, and in the latter the cloth may be gathered up and made shorter by the seam, the two feeding-wheels are moved with different velocities. This is effected by having a spur-wheel, *i*, on each of the feed-wheels, and these two spur-wheels engage another wheel, *j*, which turns on the fulcrum-pin *k* of the lever *h*, which carries a spring-ratchet hand, *l*, that engages the cogs of the wheels *j*, so that as the lever is vibrated in the usual manner an intermittent motion is imparted to the wheel *j*, and thence to the two feed-wheels in the same direction; and hence it will be seen that if the spur-wheel *i* on the feed-wheel *d* be of less diameter than the one on the feed-wheel *d'*, the periphery of the feed-wheel *d* will travel faster than the periphery of the feed-wheel *d'*, and hence that the cloth will be distended between the two feed-wheels while the seam is being formed; but if the wheel *i* on the feed-wheel *d'* be smaller than the one on the feed-wheel *d*, then the rear feed-wheel will travel with the greatest velocity, and hence the cloth will be puckered up between the two feed-wheels where the seam is being formed. By simply shifting the two feed-wheels with their spur-wheels, or shifting the spur-wheels or the feed-wheels, the

one or the other of the two specified effects can be produced at pleasure. The differential motion of the two feed-wheels may be varied at pleasure to any degree desired by substituting wheels of suitable diameter.

To accommodate the shifting of the wheels *i i* on the feed-wheels and make the wheel *j* engage both, the fulcrum-pin *k* is attached to a plate, *m*, secured to the frame by a screw, *n*, passing through an elongated slot in the plate, so that the axis of the wheel may be shifted at pleasure.

Instead of the wheel *j*, which engages the two wheels *i i*, to operate the two feed-wheels, there may be one lever and ratchet or equivalent therefor for each feed-wheel, and each lever connected with an arm, *o*, of the rock-shaft *p* by a link, *q*, with an adjustable nut, so that the relative motions of the two feed-wheels may be varied in any degree and at all times; but for the general purposes of sewing the kinds of seams to which my improvement is applicable, a determined and fixed differential motion is the one best adapted.

It will be obvious to the mechanician that many equvialent devices may be substituted for those I have above described without changing the principle of my invention; and it will also be obvious that my invention is equally applicable to other modes of feeding as well as to the feed-wheels, and therefore I do not wish to be understood as limiting myself to the use of feeding-wheels or to the modes described of imparting the differential motions.

What I do claim as my invention, and desire to secure by Letters Patent, is—

The method, substantially as herein described, of distending or gathering up the cloth or other substance, where the needle operates upon it to form the seam, by combining in a sewing-machine two distinct feeding-wheels or their equivalents moving with a differential motion, substantially as described.

ISAAC M. SINGER.

Witnesses:
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