I. M. SINGER.

Sewing Machine.

No. 10,975. Patented May 30, 1854.

Fig. 2.

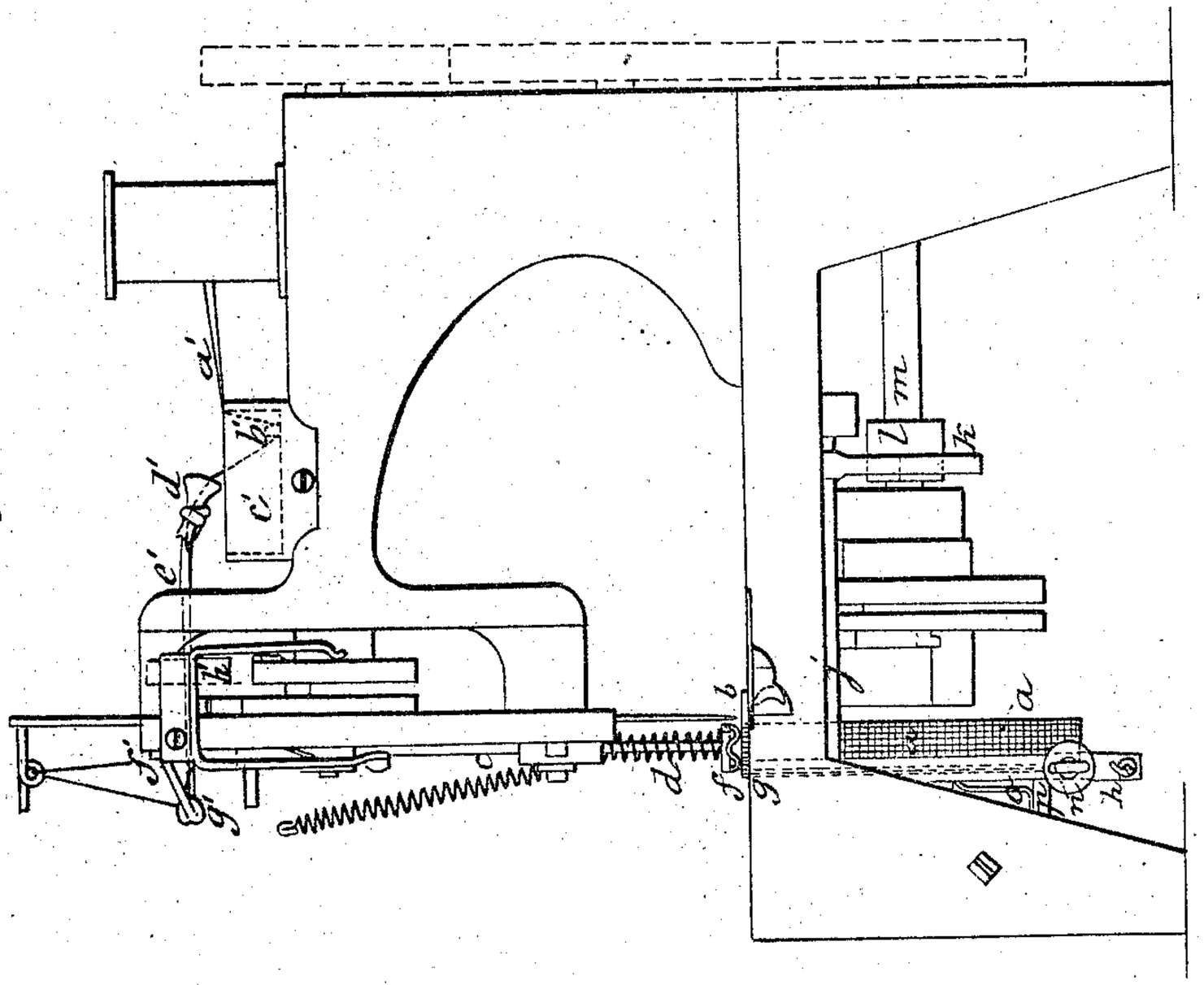
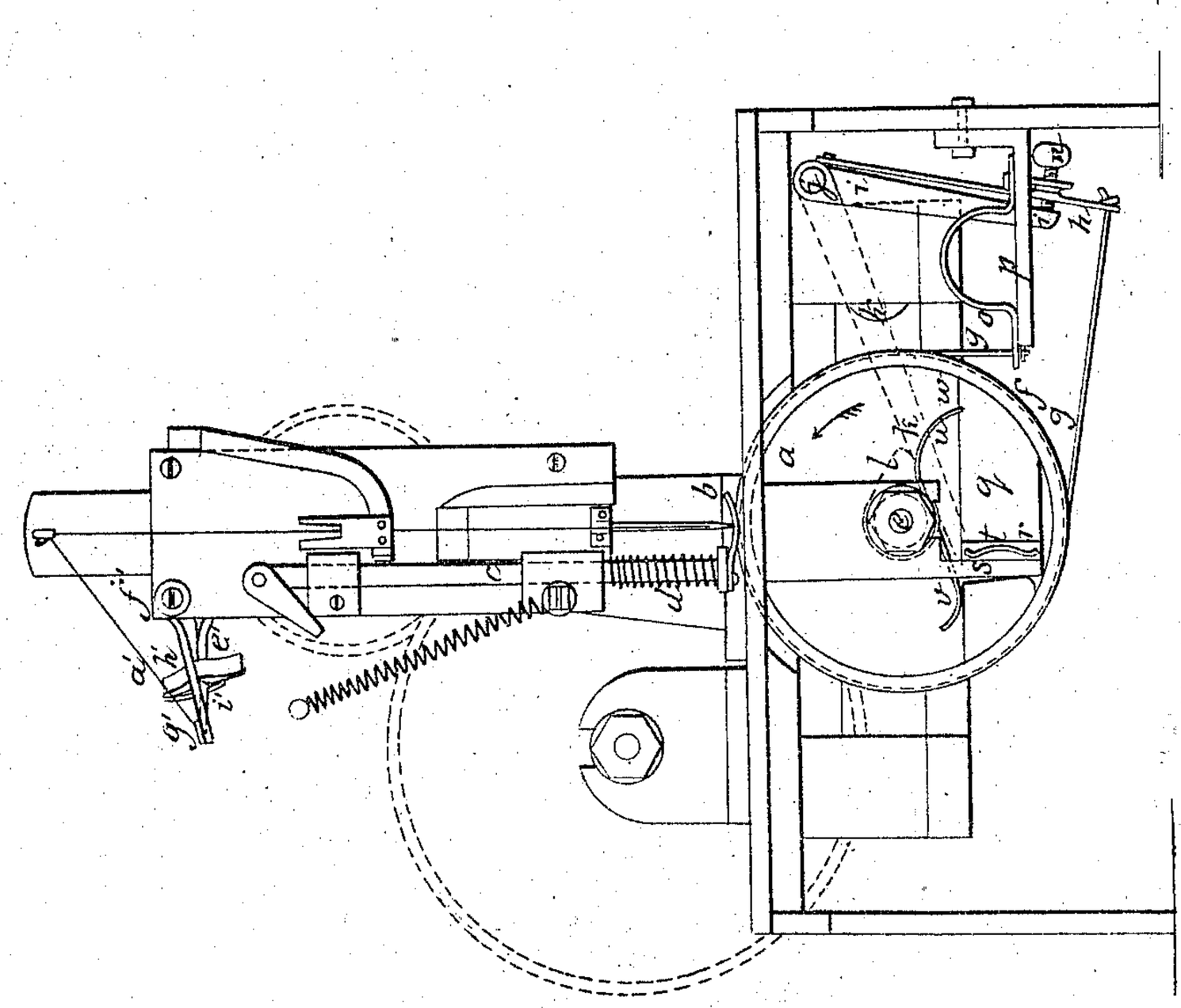


Fig. 1.



UNITED STATES PATENT OFFICE.

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

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **10,975**, dated May 30, 1854.

To all whom it may concern:

Be it known that I, ISAAC M. SINGER, of New York city, New York, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figures 1 is a front elevation of my improved machine; Fig. 2, a side elevation.

The same letters indicate like parts in all the figures.

The first part of my invention relates to the method of feeding the cloth or other material to be sewed with a view to render this part of the operation practically efficient, cheap, and not liable to derangement, while at the same time it can be readily adjusted to regulate the length of stitches. The cloth, &c., is held by a pressure-pad onto the periphery of the feeding-wheel, which is roughened or formed with minute teeth to bite sufficiently to move the cloth. The nature of this part of my invention consists in giving an intermittent feeding motion to the said wheel by means of a cord of catgut or its equivalent fitted to a groove in the periphery of the said wheel, one end of the said cord being attached to a spring connected with the arm of a rock-shaft, with a set-screw interposed to regulate the length of stitches, and the other end of the said cord attached to a reaction spring attached to the frame or to a permanent bracket, and resting thereon at a given and positive tension after drawing back the cord, so that when the cord is pulled by the arm of the rock-shaft to give the feed motion the said cord shall be drawn to a tension equal to that of the reacting spring when resting on the bracket before the said reaction spring will yield to permit the feed motion. When this method of imparting the feed motion is combined with a friction-brake in or on the said wheel, which makes a friction in one direction to resist the feed motion equal to the tension of the reaction spring when at rest that the time of starting the wheel shall be positive, and a greater friction or resistance in the reverse direction to prevent the wheel from being turned back by the tension of the cord.

The second part of my invention relates to the method of regulating the tension on the needle-thread. The methods heretofore practiced are to make tension on the body of the spool or bobbin, or by passing the thread under a spring-clip or between spring forceps or fingers. The former of these methods is objectionable in practice, for the reason that as the thread is reduced on the body of the bobbin or spool the leverage is gradually reduced, while the leverage of the friction-brake remains the same, and hence the tension on the thread will constantly vary as the diameter of the bulk of thread on the spool is diminished; and, besides, the spools or bobbins are generally made in a very imperfect manner, and when a friction-brake is applied to them these imperfections induce an irregular tension on the thread, and the other method is objectionable for the reason that any irregularity in the diameter of the thread will induce a variation in the tension, for the spring clip or forceps must produce a greater resistance to the motion of the thread when thick than when thin. The object of my invention is to avoid these defects and produce a method of making tension on the thread, which, when set, shall be practically uniform notwithstanding the varying size of the thread or of the bobbin, and which shall admit of accurate and easy adjustment; and to these ends the nature of this part of my invention consists in providing a wire with guides and with a turning wing, and passing the thread on its way from the spool, bobbin, or reel to the needle around the said wing, so that by turning the said wing on the wire the thread shall be wound around the body of the wire more or less, and thus increase or decrease the friction of the said thread in proportion to the number of turns which it makes around the body of the wire, and as the thread does not pass between any two surfaces it will be obvious that the friction which produces the tension will not be varied by the varying size of the thread.

The last part of my invention relates to the lubrication of the needle-thread during the operation of sewing leather. Great difficulty has been experienced in sewing leather, and particularly what is termed "patent-leather," by machinery. The friction of the needle and thread when passing through the leather is very great, and if the machine be operated at or near the same speed as in sewing cloth, the needle and thread become highly heated, and

in sewing patent-leather the enamel abrades the needle, and in a very short time roughens it to such an extent as to seriously impede the operation; and in all these the thread is very much chafed and weakened, and often breaks, and, besides this, the holes punched through the leather by the needle and thread are too large to hold the thread firmly after the needle is withdrawn. The object of my invention is to avoid these difficulties; and it consists in passing the needle-thread on its way to the needle through linseed-oil or its equivalent, so that when introduced into the leather it shall not only be itself lubricated, but also keep the needle lubricated, and when drawn into the leather and locked with the shuttle-thread in the form of a seam when the oil dries it shall form a cement to bind the threads together in the seam, and thoroughly close up the holes to exclude moisture.

The machine in its general structure, as represented in the accompanying drawings, is similar to the machine described in Letters Patent granted to me and bearing date the 12th day of August, 1851, and the 13th of April, 1852, and therefore it will not be necessary to give a description of the general structure and operation, except so far as it may be necessary to a clear understanding of my present improvements.

The cloth or other material to be sewed is held down onto the periphery of the feeding-wheel *a* by means of a pad, *b*, on the lower end of a sliding rod, *c*, which is forced down by the tension of a coiled spring, *d*. The feeding-wheel *a* turns freely on a stud-pin, *e*. On its outer periphery it is formed with a groove, *f*, near one edge, to receive a cord, *g*, made of catgut or other equivalent substance. One end of this cord is attached to the lower end of a spring, *h*, secured at its upper end to an arm, *i*, of a rock-shaft, *j*, provided with another arm, *k*, actuated by a cam, *l*, on the shaft *m* to give a vibratory motion to the arm *i* and spring attached thereto. The spring *h* is provided with a set-screw, *n*, which bears against the arm *i*, by the turning of which the operator can set the spring relatively to the arm to increase or shorten the feed motion to be imparted to the wheel *a*. The other end of the cord *g* is secured to the outer end of a reaction spring, *o*, which is secured to a bracket, *p*, so that the end of it to which the cord is attached shall rest on the bracket with a sufficient tension to resist the motion of the arm *i* until the cord is drawn sufficiently tight to insure the turning of the wheel before it. The reaction spring yields to permit the feed motion; and from this it will be seen that on the return motion of the arm the reaction of this spring will draw back the cord preparatory to another operation.

To the inner periphery of the wheel *a* is fitted a friction-brake, *q*, made of wood, notched at *r* to fit loosely on a bracket-piece, *s*, with a spring, *t*, interposed, and between the upper surface of this brake and the hub of the wheel there is an **S**-formed spring, *u*, interposed, one end of which bears on the surface of the brake at *v*, near to the connection of the brake with the bracket, and the other end at *w*, near to the other end of the said brake, at a much greater distance from the point of support of the said brake on the brake. The effect of this arrangement is to cause this brake to make greater resistance to the motion of the wheel in the direction the reverse of the arrow than in the direction of the feed indicated by the arrow, and the tension must be such as to cause the brake to present a resistance to the feeding motion of the wheel about equal to the tension of the reaction spring when at rest on the bracket, so that the wheel shall not be turned while the cord is drawn tight, and not until the reaction spring begins to move, and as the brake makes a greater resistance in the reversed direction it follows that the wheel will be moved in one direction, when set, with a regular motion, although not so positive as to endanger the parts of the mechanism in case of accidents, while at the same time it will be prevented from being turned back by the return motion of the cord. The needle-thread *a'*, from a loose spool, bobbin, or reel, passes through an eye, *b'*, in the bottom of a box or reservoir, *c'*, supplied with linseed-oil or its equivalent, mixed with litharge or other drier, where it is saturated with oil, and thence it passes through cloth *d'* in a guide to wipe off the surplus oil. This guide is on one end of a smooth wire, *e'*, attached to the frame at *f'*, and provided with another eye or guide, *g'*, through which the thread passes on its way to the needle, and on this wire is placed a turning wing, *h'*, which is held thereto by a spring, *i'*, so as to permit it to be turned, and yet hold it with sufficient firmness in any desired position. The thread, in passing from one eye or guide to the other, passes by this turning wing, and hence by turning the wing on the wire the thread will be wound around the wire on each side of the wing in opposite directions, and the more it is wound around the greater will be the friction of the thread, and vice versa, so that the tension on the thread can be regulated with the utmost accuracy without reference to the varying size of the thread. As the spool, bobbin, or reel from which the thread is drawn turns freely on its bearings, it will not materially affect the tension.

I do not wish to limit myself to the precise construction and arrangement of the brake, or to the manner of connecting the cord which imparts the feed motion with the arm of the rock-shaft, nor to the special manner of constructing the turning wing to regulate the tension of the thread, as these may be varied within the range of my invention by the substitution of equivalents.

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

1. The method of imparting the feed motion to the feed-wheel by means of the cord

connected at one end with the adjustable arm of the rock-shaft and the other with the reaction spring, substantially as specified, when this is combined with the friction-brakes, operating substantially as specified, and for the purpose set forth.

2. Governing and regulating the tension of the needle-thread by means of the wire with its eyes or guides, substantially as specified, in combination with the turning wing, by which the coiling or winding of the thread around the wire can be increased or decreased at pleasure, as specified.

3. In the sewing of leather, causing the needle-thread, on its way to the needle, to pass through linseed-oil or its equivalent, mixed with a drier, substantially as and for the purpose specified.

ISAAC M. SINGER.

Witnesses:

WM. H. BISHOP,

CHAS. N. BAMBURGH.