C. J. COWPERTHWAITE.

SEWING MACHINE.

No. 13,630. Patented Oct. 9, 1855.

Fig. 1

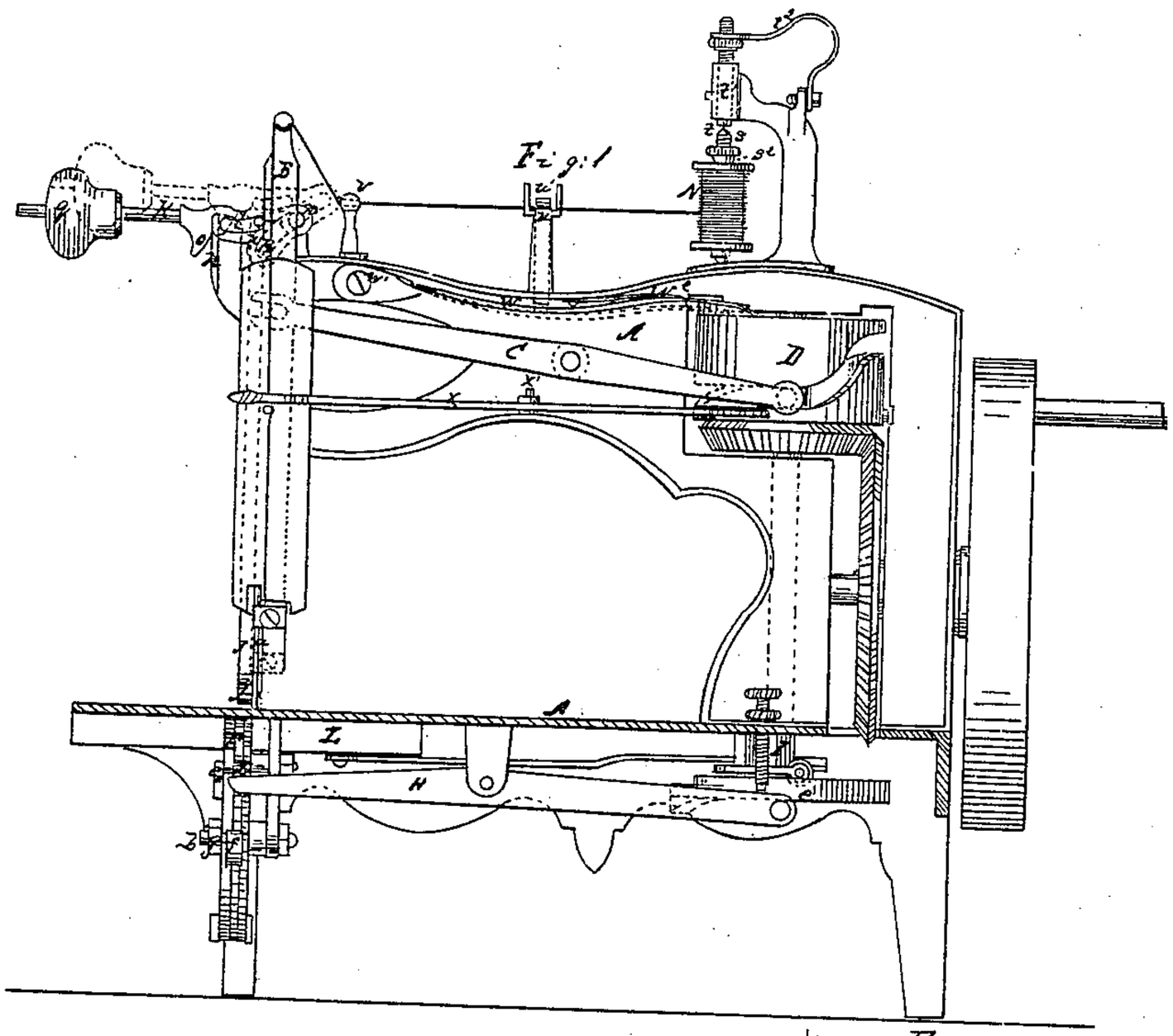

Fig. 2.

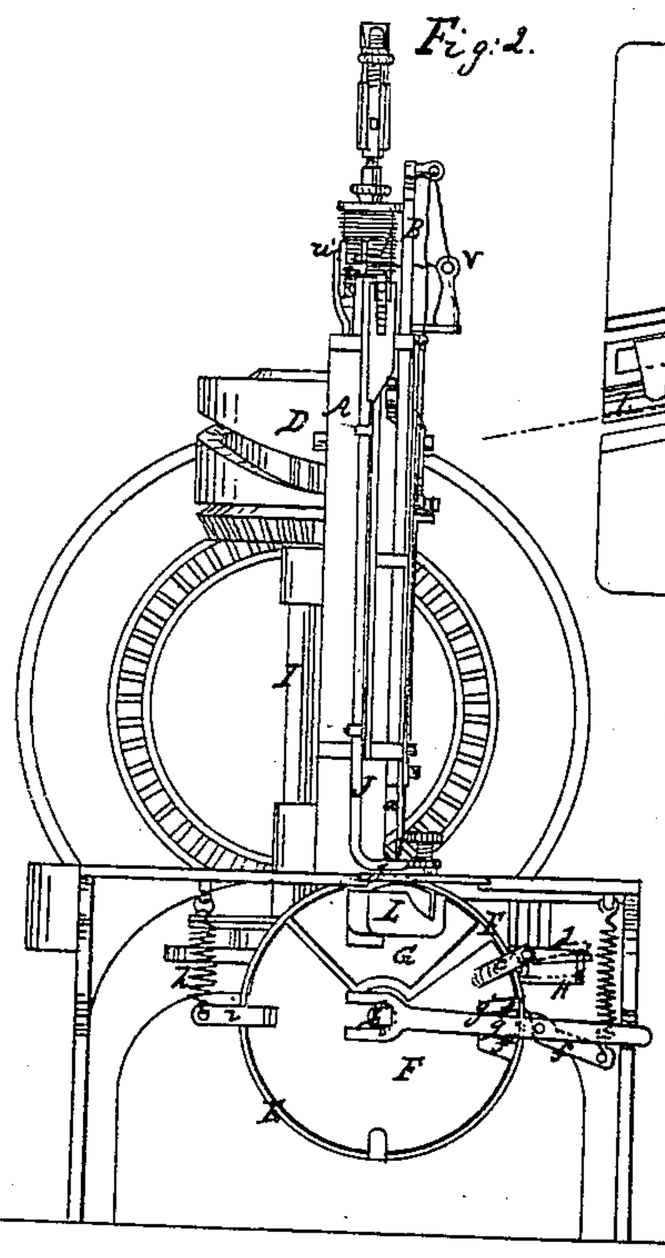

Fig. 3

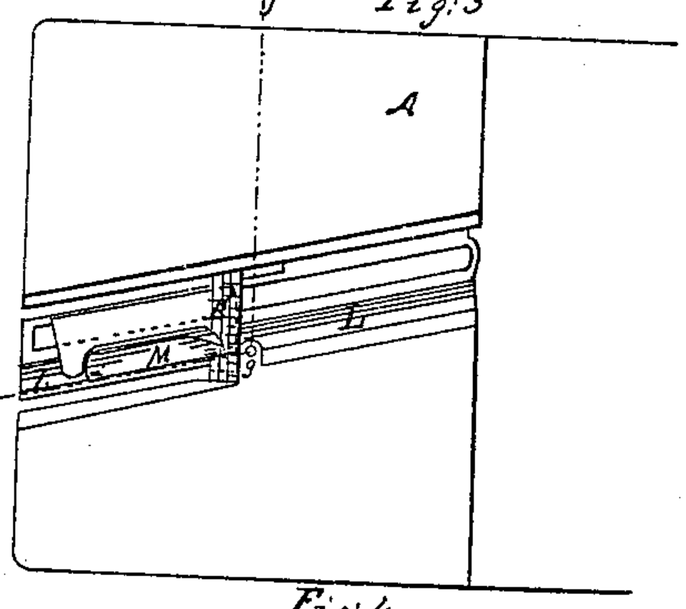

Fig. 4

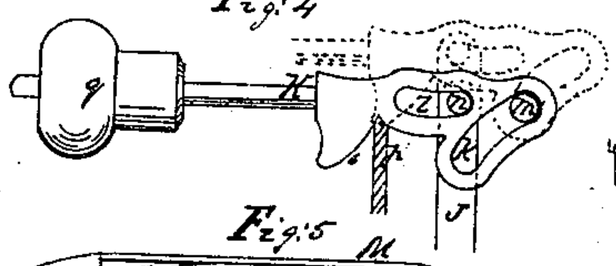

Fig. 5

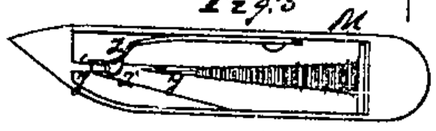

Fig. 6

Fig. 7

Fig. 8

UNITED STATES PATENT OFFICE.

C. J. COWPERTHWAITE, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **13,630,** dated October 9, 1855.

To all whom it may concern:

Be it known that I, C. J. COWPERTHWAITE, of the city and county of Philadelphia, and State of Pennsylvania, 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 of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of a machine with my improvements applied. Fig. 2 is a front view of the same. Fig. 3 is a plan of the shuttle-race and part of the feed-motion. Fig. 4 is a side view of the weighted trip-lever on a larger scale than the other figures. Fig. 5 is a side view of the shuttle, and Fig. 6 a transverse section of the same. Fig. 7 is a diagram illustrative of a portion of the invention. Fig. 8 shows the spool carrying the needle-thread in section.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists, first, in the employment of a weighted trip-lever to apply the necessary pressure to confine the cloth to the surface, by which the feeding movement is imparted to the cloth; second, in a certain oblique arrangement of the shuttle-race relatively to the line of the feeding movement of the sewing, whereby the stitches formed by a needle and shuttle or their equivalents are all caused to be produced in line with each other.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A is the stand or framing of the machine, B the needle-bar carrying the needle *a*, C the lever, and D the cam which operates the needle-bar, all of which parts are substantially like the corresponding parts of other machines.

E is a thin ring or circular band of metal, the external face of which imparts the feed-motion to the cloth, and for that purpose is serrated. To the interior of this band is fitted loosely a wheel, F, about one-quarter of which, at the upper part, is cut away or omitted, as shown in Fig. 2, to make room for a fixed sector, G, the arc of which fits to the interior of the ring B. This sector, which is secured close under the table of the machine, is so much smaller than the omitted portion of the wheel F as to allow the wheel to be moved a little way upon a fixed axle, *b*. The positions of the wheel F and sector G are such that the outer surface of the ring stands just level with or slightly above the table A, through an opening in which it works like the feed-wheel of many sewing-machines. The wheel F carries an arm, *c*, which projects outward beyond the ring, and has pivoted to it a lever-dog, *d*, the point of which is in contact with the outer face of the ring E, and the opposite end rests upon the front end of a lever, H, which hangs under the table A, as shown in Fig. 2. The back end of the lever H is depressed at every revolution of a cam, *e*, on the principal shaft I of the machine, and by that means its front end is thrown up and caused to act upon the lever-dog to make it confine the ring E to the wheel F, and, having done so, to move the wheel upon its axle *b*, thereby moving the ring to produce the feed movement. The ring is only allowed to move in the proper direction for that purpose, which is indicated by an arrow in Fig. 2, being prevented moving in the opposite direction by a spring-dog, *f*, which is attached to a brace, *g*, which extends from the axle *b* to one side of the stand of the machine, the said dog clamping the ring to a projecting piece, *f'*, which is secured to the back of the brace *g* and stands within an opening, *g'*, made in the periphery of the wheel F. The ring E being retained in this way, the wheel F is allowed to be returned alone, to be ready for the next feed movement, by a spring, *h*, connecting an arm, *i*, thereof to the table. The length of feed movement may be regulated by a screw applied either to the arm *i* or the lever H in a substantially similar manner to that of other sewing-machines which are operated by a lever or levers.

J is an upright bar fitted to slide in the stand of the machine, and provided with a bent foot, *j*, at the bottom, to bear upon the upper surface of the cloth, and to confine it to the surface by which the feed motion is imparted. This bar or its equivalent is used in many other sewing-machines, in some of which it has been secured rigidly in a position to confine the cloth. In others a weight has been applied to the bar, and in others a spring has been employed to press down the bar to confine the cloth, the latter being the common method. This bar requires to be raised when it is necessary to adjust a piece of cloth to start the

work, and also when it is necessary to remedy any defect in the seam, and when so raised generally requires to be secured by a set-screw or other means. On account of this raising of the bar J, the needle-bar cannot be allowed to descend within some distance of the table, for if it were and it should be set in motion with the bar J raised it would strike and be nearly sure to bend or break off the foot. For the above reason the needles of sewing-machines have had to be made longer than would otherwise have been necessary, the great length making them very weak. To obviate the above difficulty and allow the needle-bar to approach to within a distance of the table but little exceeding the thickness of the foot *j* and enable a short needle to be used, I employ the weighted trip-lever K, (shown on the machine in Fig. 1 and detached in Fig. 4,) to give pressure to the bar J, and, also, when the said bar is raised to hold it up so long as it is not struck by the descent of the needle-bar, and then to let it drop. This weighted trip-lever K has two curved slots, *k l*, in it. The former slot is nearly horizontal at its back part, and from the back gradually descending until at the front it is nearly vertical, and it receives a stationary fulcrum-pin, *m*, attached to the stand of the machine. The latter slot is in the form of an inverted arc, and it receives a pin, *n*, which is secured near the upper end of the bar J. The said lever has also a curved inclined piece, *o*, projecting from its under side. When the bar J is down, the lever K occupies the position shown in black outline in Figs. 1 and 4, the pin *m* at that time occupying the extreme back of the slot *k*, and the lever being prevented moving backward on the said pin by the projecting piece *o* on its under side being in contact with a fixed stop-piece, *p*, attached to the stand of the machine. In this condition the lever gives to the bar J such an amount of downward pressure as is due to the weight *q* which is applied to it and to the length of the lever, which now acts as a lever of the second order. To raise the bar J the operator takes hold of the weighted end of the lever and pushes the lever upward or backward until the bottom of the projection *o* on the lever arrives at the top of the stop-piece *p*, as shown in red outline in Figs. 1 and 4, by which movement the character of the lever is changed from a lever of the second to one of the first order; with *p* for a fulcrum, and instead of pressing on the bar J it holds it up. When the lever K is in this position, with the bar J raised, if the foot should be struck by the needle-bar and commence to be pushed down, the slot *k* would move down the pin *m*, and by moving a very little way would throw the lever bodily forward and throw the bottom of the projecting piece *o* off the top of the stop-piece *p*, allowing the inclined back side of the projection to slide down the stop-piece *p*, and the slot *k* to slide all the way down the pin *m*, bringing down the bar J.

Another important characteristic of the weighted trip-lever is that it does not readily yield to any sudden upward impulse which the bar may receive, and consequently if any accidental knot or kink in the thread should occur under the cloth the foot would not yield to the next upward movement of the needle, but would still confine the cloth to the feed surface or table, perhaps causing the thread to be broken, but doing no damage to the needle, as is almost invariably done by the formation of a knot or kink when a spring is used to confine the cloth, owing to the spring yielding and allowing the upward motion of the needle to displace the cloth, and then causing the needle to deviate from its proper path and during the descent to strike some part of the machine.

L is the shuttle-race, (shown best in Fig. 3,) which stands in or parallel with a line forming angles of about one hundred and five degrees and seventy-five degrees with the line 8 9, in which the cloth moves, or with the plane of revolution of the feed-ring E or its equivalent, as shown by a red line in Fig. 3, the greater angle on that side of the line 8 9 from which the shuttle advances being toward that side of the shuttle M which is farthest from the needle. (See the angle L, 8 9, Fig. 3. To explain clearly the effect of that arrangement it is necessary to refer, briefly, to the machines in general use, referring to Fig. 7 of the drawings. The most common arrangement in those machines is perhaps to have the shuttle-race parallel with the feed-motion, or in the direction of the arrow shown in Fig. 7, the eye * of the needle *a* being at right angles, or nearly so, to the path of the shuttle. In this way the ends of those parts of every two consecutive stitches which are seen on the front or upper side of the cloth are placed side by side, as represented in the last-named figure, which gives the seam more or less a zigzag appearance. In other machines the shuttle-race and feed-motion are at right angles to each other, and the eye of the needle, being at right angles to the shuttle-race, is parallel with the line of sewing, which would make the stitches lie all in a straight line were it not that the shuttle, in passing through, drags that side of the loop between which and the needle it passes out of the line. Some attempts have been made to remedy the above defects by changing the direction of the eye of the needle, but with little success. By arranging the shuttle-race, as shown in Fig. 3, obliquely to form the angle 8 9, as before described, were it not for the above-mentioned dragging action of the shuttle the stitches would be at right angles with the shuttle-race, and consequently not directly in the line of sewing; but the dragging action of the shuttle on the outer side of the loop, or side farthest from the needle, draws every stitch into its place. No positive rule can be set for the proper angle L 8 9, but it must be greater than a right angle, and will depend in a great measure on the form of the point of the shuttle, a blunt-pointed shuttle giving the loop a greater drag and requiring a more obtuse angle and s

sharper shuttle for the opposite reason requiring a less obtuse angle.

N is the spool which carries the needle-thread, which is the common spool on which the thread is sold by the manufacturer or dealer, and *s* is a screwed spindle small enough and long enough to pass through the center hole in the spool, having a head, *s'*, with its inner side conical, as shown in Fig. 8, to enter a short distance into one end of the said hole. s^2 is a nut by which the spool is secured tightly to the spindle. The nut is conical on its inner side, like the head of the spindle, and thus when the nut is screwed up the two cones, entering opposite ends of the center hole in the spool, find the exact center thereof, and the spool is secured concentrically to the spindle. The spindle is made with male cone centers at its ends, to be received between two female centers, one of which is fixed on the top of the stand A, and the other in the end of a small slider, *t*, working in a fixed guide, *t'*, the said slider having a spring, t^2, applied to force its female center into contact with the end of the spindle. This manner of applying the spool insures its working concentrically and with uniform friction, the friction being all on the male and female centers. These results contribute in no small degree to the production of uniform stitches, and cannot be obtained under the ordinary method of using the thread from the spool on which it comes from the manufacturer or dealer, which is to place it so as to turn on a fixed spindle; but the center holes in the spools being of different sizes, it is impossible to make them all turn truly on the spindle.

The device by which the length of thread let off from spool is regulated positively consists of a double fork or fixed bearing-piece, *u*, on the top of the stand of the machine, and a movable clamping or check-piece, *u'*, between which two pieces the needle-thread passes on its way from the spool to the fixed guide *v*, through which it is conducted to a guide at the top of the needle-bar. The movable piece *u'* is connected with a lever, *w*, which swings from one end on a pivot, *w'*, and has its other end bearing upon the top of the cam D, by which the needle-bar is operated. The lever *w* is depressed by a spring, w^2, to pull down the clamping-piece *u* to make it bite the thread. The upper part of the cam is so formed as to leave the clamping-piece entirely under the influence of the spring and in operation upon the thread during the entire revolution of the machine, except from the time the point of the needle leaves the cloth till the ascent of the needle terminates, when it acts upon the lever *w* to raise up the clamping-piece to free the thread and allow a proper quantity to be drawn from the spool by the ascent of the needle, but during the whole time the needle is in the cloth and the interlacing of the two threads is being performed to serve as a positive check to the needle-thread. The length of thread given out is varied by moving the guide *v;* but as a substantially-similar movable guide is used in other machines to effect the same purpose, this needs no particular description.

The device by which the thread is extended before the entrance of the needle into the cloth consists of a lever, *x*, working horizontally on a pivot, *x'*, having one arm opposite to the lower portion of the cam D, and the other arm, which is elastic, so placed as to be capable of clamping the needle-thread some distance above the needle against the upright slide P, in which the needle-bar works. The part of the cam which acts on this lever is so formed as to leave it free and not to allow it to clamp the thread except from the time the descent of the needle commences until the eye thereof has reached the cloth, thus keeping the thread extended as the needle enters the cloth and at the right side of the needle, thus preventing the kinking of the thread, insuring its entrance on the proper side of the needle. The thread must be liberated as soon as the eye of the needle has reached the cloth, in order to enable the needle to complete its descent without breaking the thread.

I do not claim the application of a weight simply to give pressure to the cloth-holder, either fixed or adjustable; but

I claim—

1. The weighted trip-lever K, applied, substantially as herein described, to the bar J or its equivalent, which holds the cloth so as to serve not only to apply pressure to the cloth, but to hold up the said bar or equivalent from the cloth when desired, and also to allow the said bar or equivalent, when its foot is struck by the needle-bar while it is held up, to descend and to hold it down again until it is lifted by the operator, substantially as herein described.

2. Arranging the shuttle-race obliquely to the direction in which the cloth is moved to produce the seam or line of sewing, substantially as herein described, for the purpose of causing the visible parts of the stitches on the front or upper side of the cloth to be straight or all in the same line.

C. J. COWPERTHWAITE.

Witnesses:
CHARLES D. FREEMAN,
JOHN W. JACKSON.