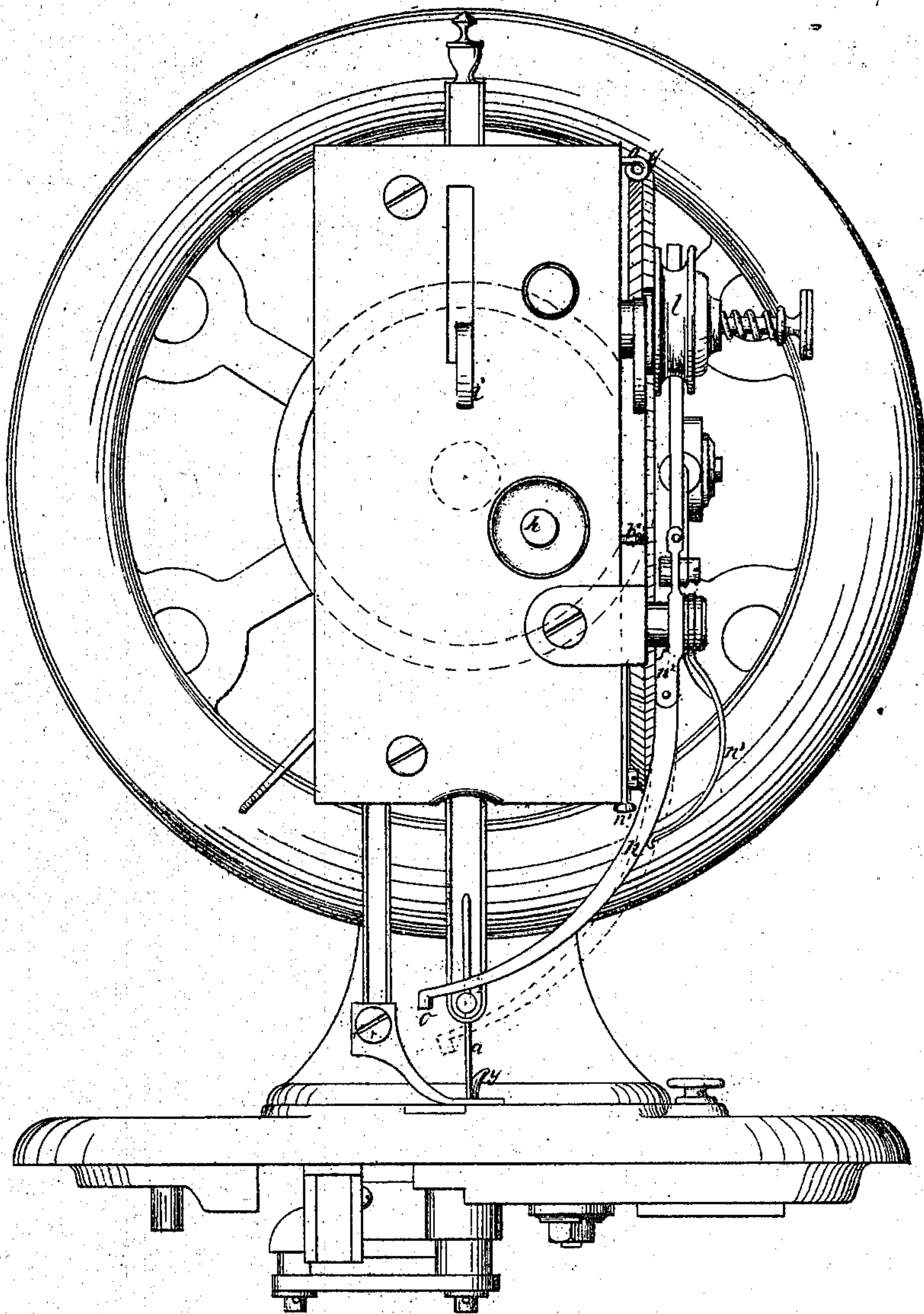


I. NASCH.  
BUTTONHOLE SEWING MACHINE.

No. 104,630.

Patented June 21, 1870.

*Fig. 1.*



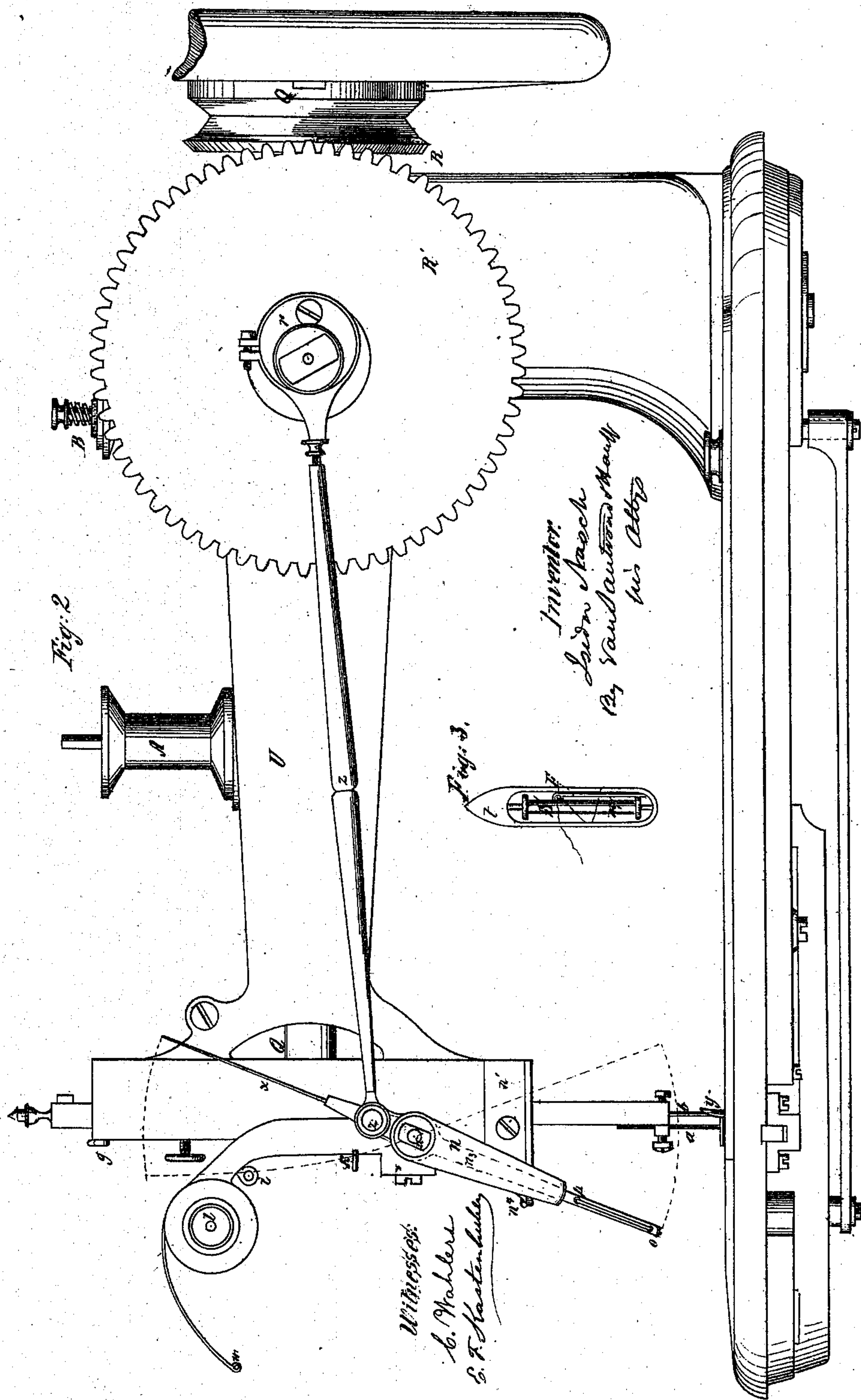
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# United States Patent Office.

ISIDOR NASCH, OF BERLIN, PRUSSIA.

Letters Patent No. 104,630, dated June 21, 1870.

## IMPROVEMENT IN BUTTON-HOLE SEWING-MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, ISIDOR NASCH, of Berlin, in the Kingdom of Prussia, have invented a new Button-hole Sewing-Machine; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawing making a part of the same, in which—

Figure 1 is a front elevation of my machine, and

Figure 2 is a side elevation.

Figure 3 is a view of the shuttle detached.

My invention relates to machines for sewing button-holes; and consists in the combination of two needles, arranged transversely to the direction of the feed, whereof one works through the cloth and the other through the button-hole, with a shuttle and a vibrating arm, which delivers the gimp or binding-cord from its end, and vibrates past the needles in such a manner as to draw their two threads together while the stitches are taken, the said arm also being provided at its upper end with a spring, which is pressed at the proper time, by the vibration of the arm, against the gimp-spool, to produce an intermittent tension thereon.

The letters *a b* designate two needles, each having a separate thread.

The needle *a* receives its thread from the loose spool *A*, whose thread passes through the eye *g*, thence around the fixed disk or plate *h*, whose periphery is grooved to receive the thread, thence through the eye of the spring take-up *i*, and thence through the eye of the needle *a*.

The needle *b* receives its thread from the spool *B*, to which pressure is applied for the purpose of creating suitable friction on the spool, by means of a spiral spring and nut on the spindle of the spool, in the usual manner, as is shown in fig. 2.

The thread from this spool *B* passes through the eye *k*, thence through the eye of the take-up *i*, and thence down to the needle *b*.

The gimp-thread or cord is on the third spool, *l*, which is arranged in such a position that it can be reached by the upper part of the vibrating arm or bow *n*, as hereinafter explained.

The gimp-spool *l* is prevented from turning too freely by means of a spring, and nut, and washer, in the usual manner, and the gimp-thread or cord is conducted from it through an eye at the end of a steel spring, *m*, which projects in front of the spool, as is shown in fig. 2, whence it is taken downward and passed through an eye, *n*<sup>4</sup>, formed on the front corner of the cam *n*<sup>1</sup>, thence through the upper hole *p* of arm *n*, and thence through the lower hole *o* of that arm, whence it passes to the button-hole, on the edge of which it is secured by the needle-threads.

The fourth thread proceeds from the spool *m* in the shuttle *t*.

The sides of the shuttle are provided with the usual holes for tension, through which holes the shuttle-thread is passed, and also with a bar or evener for taking the thread directly from the spool, which, in this example, is placed on the right side of the shuttle, observing fig. 3.

After the thread has been passed through the tension-holes in the left side of the shuttle, observing fig. 3, it goes through the eye *s*, made in the free end of a spring plate, *F*, arranged within the shuttle, along its right-hand side.

From the spring *F*, the thread is returned again across the spool *m*, and finally passes out through a hole in the left-hand side of the shuttle.

The main shaft *Q* extends through the hollow arm *U* of the machine, and gives motion in the usual manner to the needle-bar, which carries the two needles.

Upon the said shaft *Q* is fixed a bevel-wheel, *R*, which gears with a larger bevel-wheel, *R'*, that turns upon a stud on the hollow arm *3*, and upon the hub of wheel *R'* is an eccentric, *r*, which is connected by the adjustable connecting-rod *Z* to the upper part of the arm or bow *n*, in such a manner that the arm will be vibrated around its pivot *w*, which is placed in the same vertical line with the space between the two needles, and said arm is caused to vibrate in a curved path, opposite to and to the right and left of the needles, by means of a cam, *n*<sup>1</sup>, arranged below the pivot *w*, the said arm having a joint, *n*<sup>2</sup>, below its pivot, which allows it to bend outward and inward, and conform to the cam, against which it is constantly pressed by the spring *n*<sup>3</sup>, which compels the arm to follow the course of the cam, the cam being so formed that the arm clears the needles while passing in front of them, and moves around to the right and left of the needles *a b*, to the position shown in fig. 1.

The upper part of the vibrating arm *n* terminates in a flat spring, *x*, which is arranged in such a manner as to come against the gimp-spool *l* at every movement of the arm *n* toward the right, observing fig. 2, whereby the spool is held fast, and the gimp is stretched until the arm *n* begins its return movement toward the left.

Alongside of the feed-dog of the machine, and in front of the right-hand needle *b*, I provide a vertical semicircular horn, *y*, which rises from the table, as is represented in the drawing, for the purpose of entering the button-hole and guiding it in the operation of sewing its edges; and I put it in front of the needle *b*, for the purpose of causing that needle to work through the button-hole, and not through the cloth, the horn *y* having its concave side toward the needle *b*, which



moves up and down in such a line that it is partly surrounded by the horn.

The operation of the machine is as follows:

The drawing shows the lowest position of the needles; with the vibrating gimp-arm *n* on the left-hand side of needle *a*, and said arm is also represented in dotted outline at the right of needle *b*.

We will first consider the operation when the arm *n* has just arrived to the position on the dotted line on the right in fig. 2.

By turning the driving-shaft, the two needles *a* *b* move downward, the needle *a*, which I make thinner than the needle *b*, going through the stuff, while needle *b* passes through the button-hole and behind the horn *y*.

The gimp-arm *n* moves simultaneously toward the left, and gains a vertical position when the needles have reached their lowest position at the time the shuttle is going through the loops of their threads.

A twofold or compound movement is communicated to the arm *n*, namely, a movement toward the left and right, past both needles, and a movement at right angles thereto, in obedience to the curve of the cam *n'*.

In its movement toward the left, as it passes needle *b*, it catches the thread of that needle above its eye, the end of the arm having a lateral lip on each side for the purpose of taking and retaining the needle-threads, and bears it toward the left and places it upon the thread of the needle *a*, and, meantime, the stuff is moved along by the feeding device, and the needles are lifted.

The driving-shaft continuing its movement, the two

needles again descend, and stitch over or straddle the gimp while the arm *n* moves toward the right, and, when the arm again reaches a perpendicular position in front of the needles, the latter will have regained their deepest position, and, the movement of the parts being continued, the arm moves to its extreme position on the right, its spring meantime pressing against the gimp-spool, and arresting the delivery of the gimp and tightening it, whereby the thread of the needle *a* is drawn by the gimp over to the thread of needle *b*, so as to unite them together while the next stitch is being taken, and the over-cast stitch is thus produced, the gimp bearing both threads alternately to the right and left, so that, while the needles themselves straddle the gimp, and needle *a* penetrates the cloth and needle *b* the button-hole, both threads are alternately interlocked with each other.

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

1. The vibrating arm *n*, with its spring *x*, combined and operating in connection with the spool *l* and needles *a* *b*, substantially as described.

2. The vibrating arm *n* and its spring *x*, in combination with the gimp-spool *l*, substantially as described.

3. The vibrating hinged thread-carrying arm *n*, in combination with the cam *n'* on the head of the machine, and the two needles, substantially as described.

ISIDOR NASCH.

Witnesses:

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