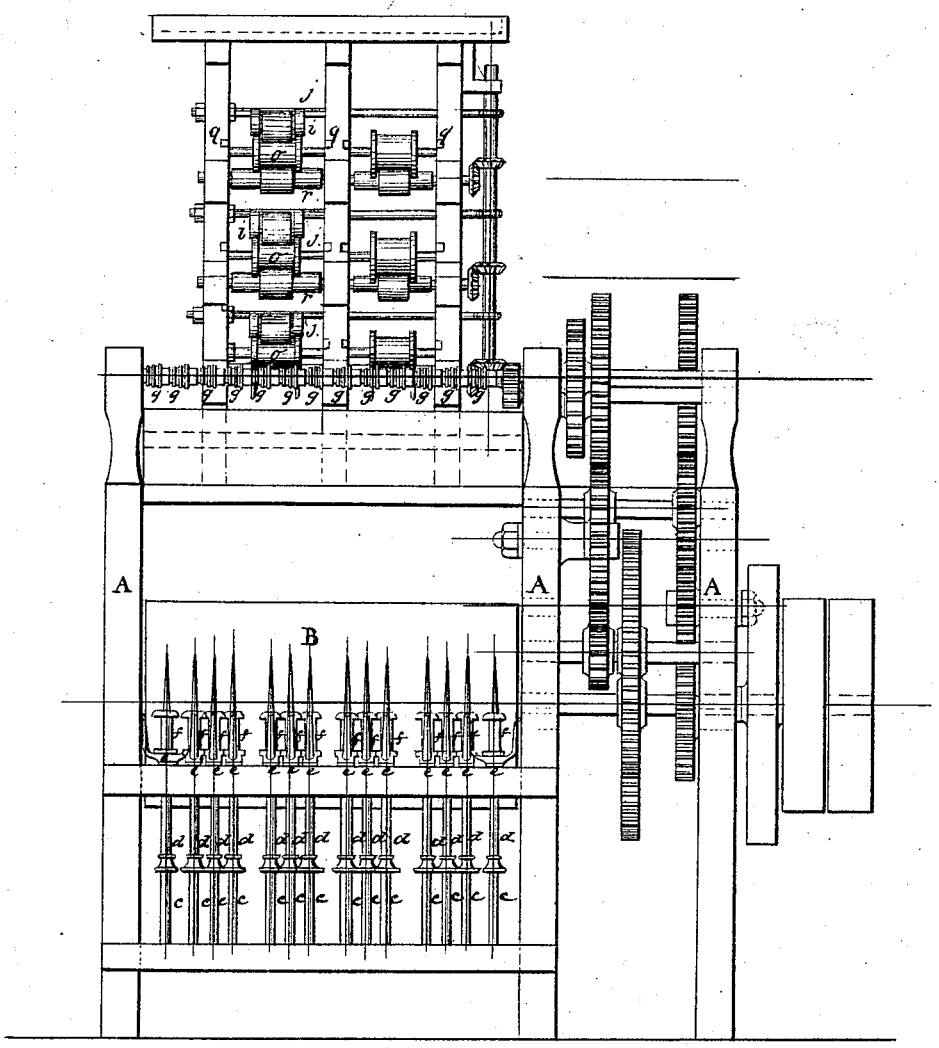
3 Sheets--Sheet 1.

T. UNSWORTH.

Doubling-Machine.

No. 169,315. Patented Oct. 26, 1875.

Fig. 1.



Witnesses:

John Lewis

Jas. Clarke

Inventor:

Thomas Unsworth

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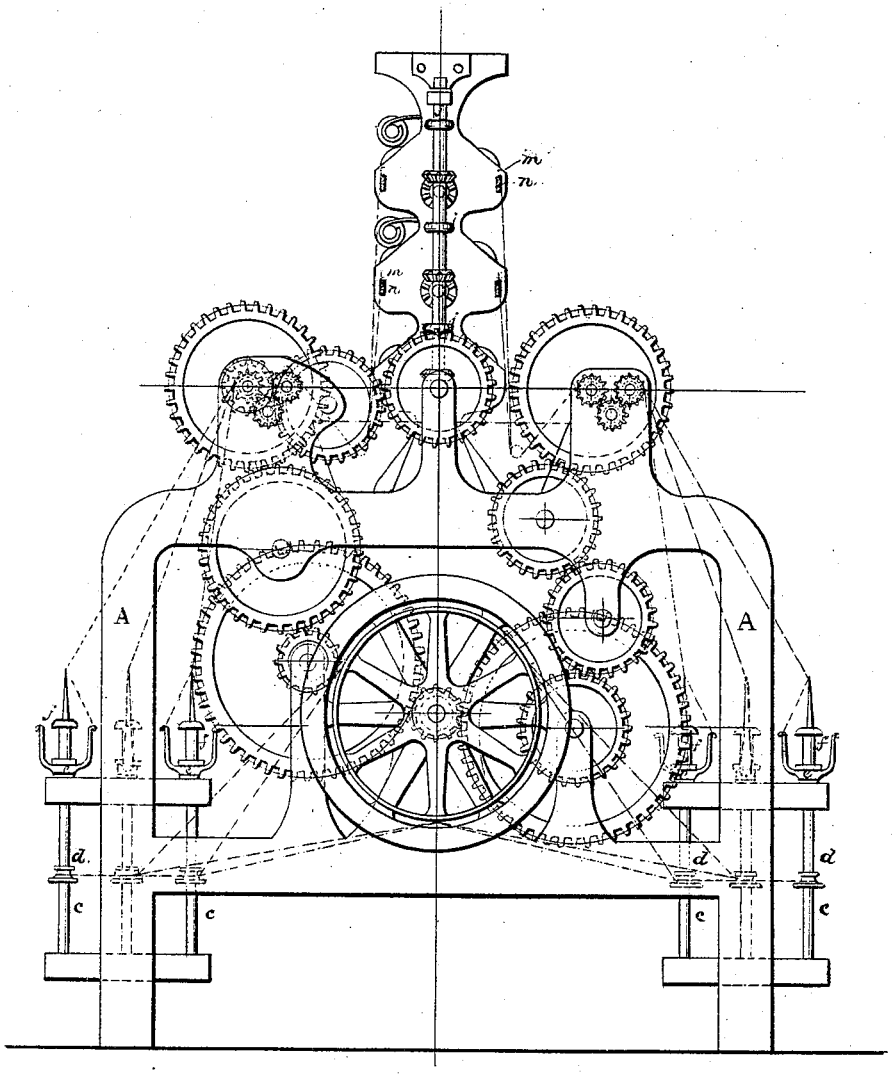
T. UNSWORTH.

Doubling-Machine.

No. 169,315. Patented Oct. 26, 1875.

Fig. 2.



Witnesses:

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T. UNSWORTH.

Doubling-Machine.

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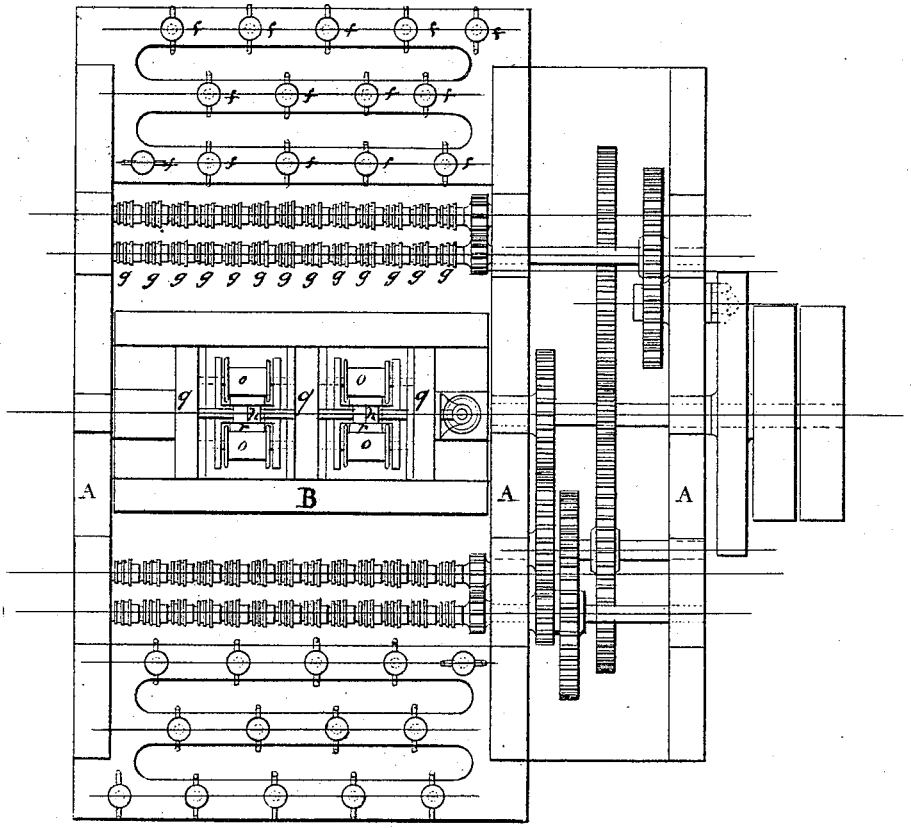
Fig. 3.



Witnesses:

John Lewis

Jas Clarke

Inventor:

Thomas Unsworth

UNITED STATES PATENT OFFICE.

THOMAS UNSWORTH, OF PRESTON, ENGLAND.

IMPROVEMENT IN DOUBLING-MACHINES.

Specification forming part of Letters Patent No. **169,315**, dated October 26, 1875; application filed May 19, 1874.

To all whom it may concern:

Be it known that I, THOMAS UNSWORTH, of Preston, England, have invented new Improvements in Doubling-Machines; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a front view of a machine; Fig. 2, an end view of the same; Fig. 3, a plan, with top board removed.

These several figures are marked by corresponding letters of reference.

On the 26th day of March, 1872, were granted to me Letters Patent for improvements in machinery for making banding-cord, or other such like article, No. 124,988. In that machine I wind the yarns from cops or bobbins, stretch them by my conical rollers, and double them across the machine to the other side where the cord is finished.

My present invention is for doubling alone, and the machine is so arranged as to enable me to place three times the usual number of spindles in the same space longitudinally.

A A in the accompanying drawings is the machine-framing; B, the drum, from which I drive my flier-spindles *c c*. *e e* are the fliers fixed onto spindles *c c*. *f f* are bobbins of yarn, to take up and double from. *g g* are conical stretching-rollers. Onto these stretching-rollers the several threads of yarn are doubled, and by them are stretched by passing from the small ends of the front cones around the next larger groove of the back cone, and as many times around the pair as there are grooves, or the nature of the work may require. From thence they pass through a trough of water (if required) to eyelets *m* fixed into the traverse-rods *n*, which are worked backward and forward the length of and in front of the take-up bobbins *o*. These bobbins are worked by friction-rollers *r r*, one roller working two take-up bobbins—that is, one bobbin on each side of the machine. In the sides of the upper frame *q q* are grooves for the ends of the take-up bobbin-spindles to slide in and to work freely. These grooves are made to a suitable angle, the outer end inclining upward, so that the tendency of the bobbin, when put in, is to move downward to the friction-roller. To keep such bobbin to the friction-roller, I have placed rods *j j* above each friction-roller, on which I hang forked levers *i* by swivel-joints *h*. The two fork ends of this lever hang down, and bear with some weight onto the take-up bobbin-spindles between the frame *q* and the ends of the bobbins *o*, giving sufficient friction between such bobbins and rollers to insure at all times the take-up. These bobbins are taken out when full and replaced without stopping the machine. By arranging the take-up bobbins in tiers, one over the other, I am enabled to use larger bobbins, and yet place them on the machine compactly, taking up only space not available for other purposes, the bobbins being all actuated by friction-rollers operated from a common shaft. By this arrangement, also, the yarns or threads are kept constantly and distinctly in view, which would not be the case were the tiers side by side, and the threads are kept more distinct by placing the bobbins in two or more rows rather than in one row.

There are three rows of spindles on each side of the machine, driven by means of bands from the drum or other equivalent B; and one band is so arranged as to drive two or more spindles, if desired.

There are three tiers of take-up bobbins on each side of the machine. The requisite speeds of the several parts of the machine are obtained by ordinary gearing, as shown, or by bands, straps, or other equivalent.

I make these machines any length the room or requirements demand.

The traverse motion for working the slide-bars *n n* is in every way the same as that used in a self-stopping winding-frame, for which Letters Patent were granted to me and Edwd. Whalley, on the 26th day of March, 1872.

It will thus be seen by the above arrangement any number of ends may be doubled, stretched, and evenly laid onto the take-up bobbins, changed, or altered, without stopping the machine. Likewise, in the same space and by nearly the same power, three times the same work may be got off.

There are certain parts of this machine secured to me by the before-mentioned patents, and a great similarity in many parts—such, for instance, as pliers, stretching conical rollers, taking-up motions, bobbins, and the driving-gear. These I do not herein claim; but

I claim as my invention—

The combination of the spindles and pliers, arranged in double rows to twist and double the threads, with the take-up bobbins *o*, friction-rollers *r*, and forked levers *i*, arranged in tiers on each side of the frame, substantially as and for the purposes herein set forth.

THOMAS UNSWORTH.

Witnesses:

JOHN LEWIS,

JAS. CLARKE.