2 Sheets—Sheet 1

# T. KERSHAW.

## Doubling and Twisting Machine.

**No. 211,745.** **Patented Jan. 28, 1879.**

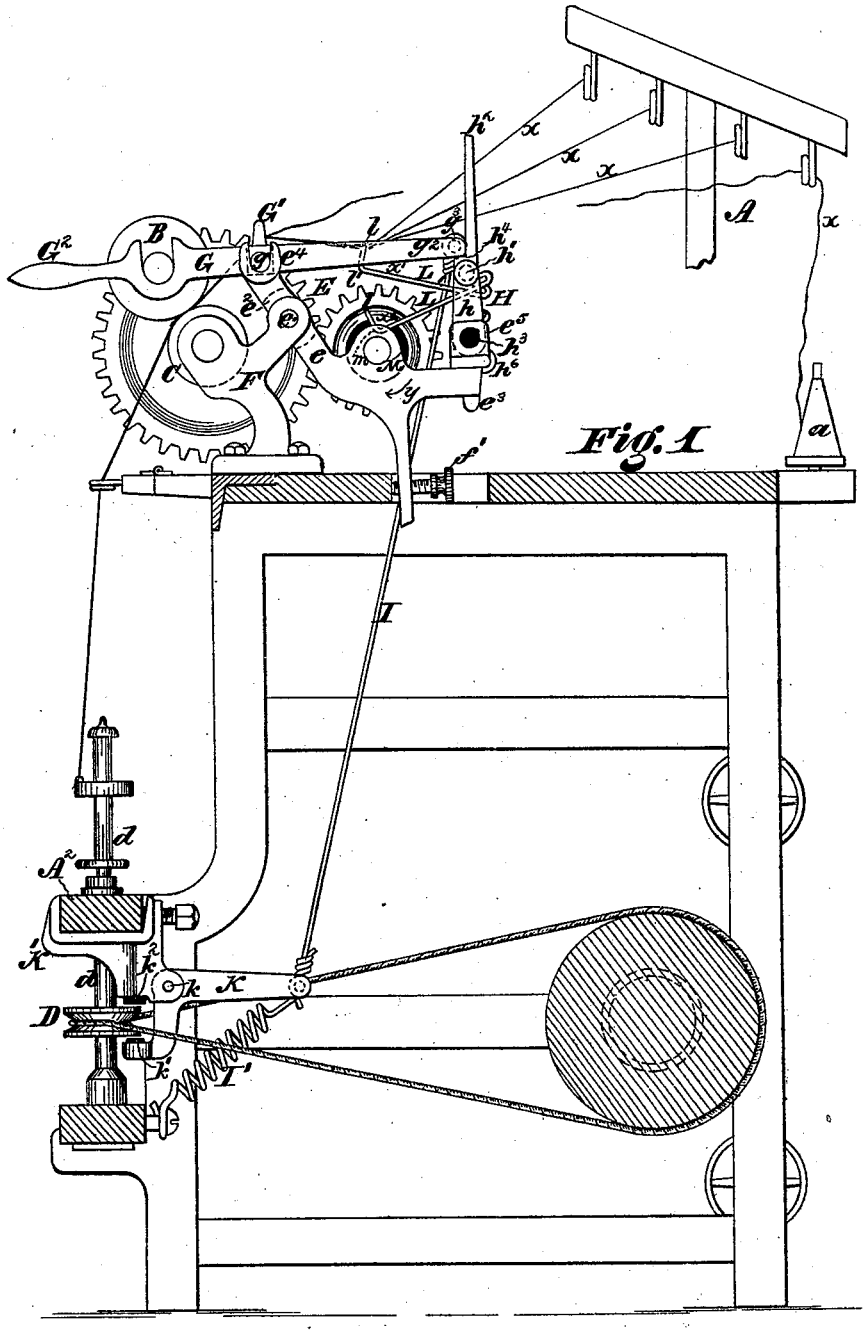

Fig. 1

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Jos. B. Connally

INVENTOR

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By Connally Bro.,

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2 Sheets—Sheet 2.

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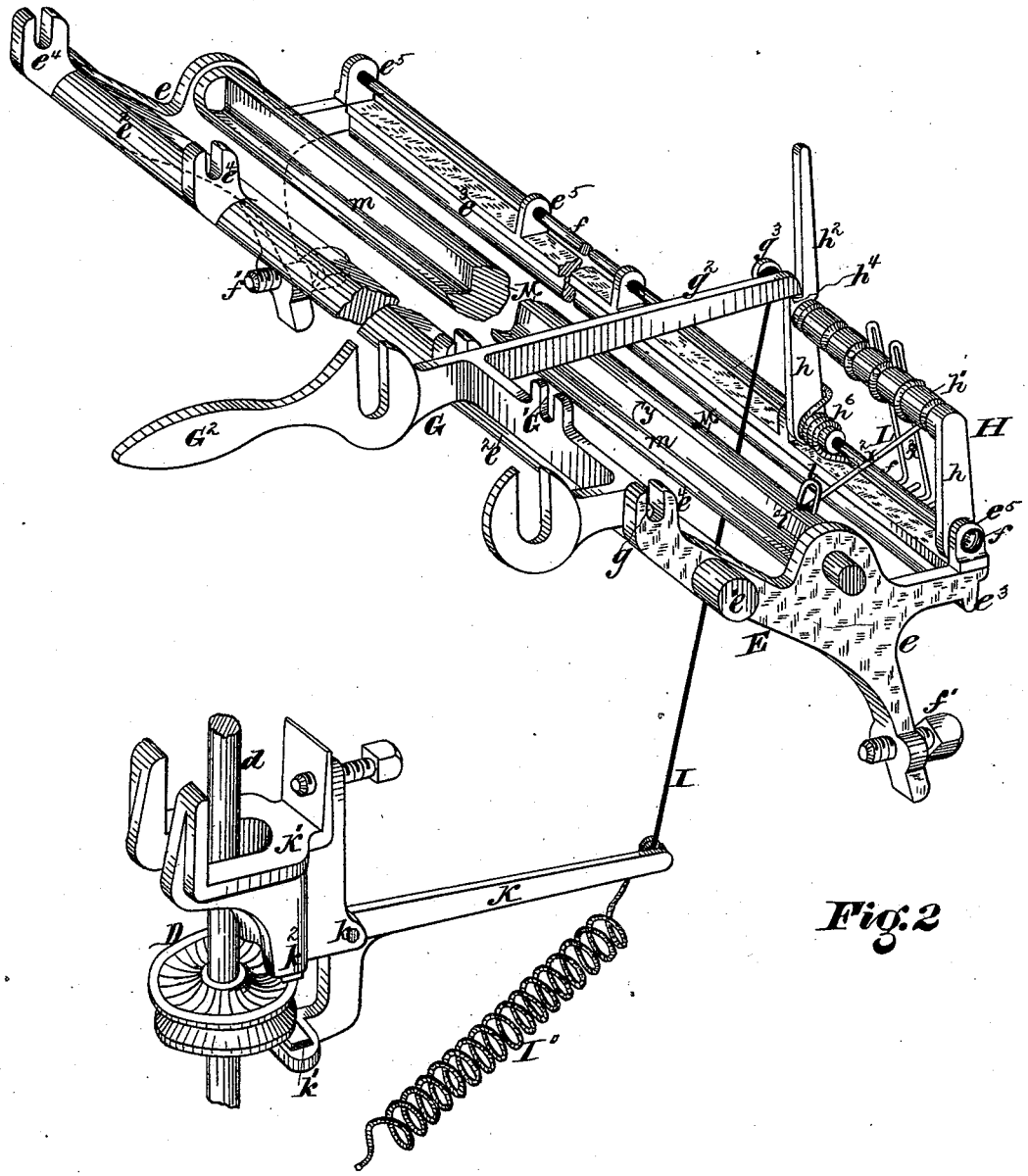

Fig. 2

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# UNITED STATES PATENT OFFICE.

THOMAS KERSHAW, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN DOUBLING AND TWISTING MACHINES.

Specification forming part of Letters Patent No. **211,745**, dated January 28, 1879; application filed July 12, 1878.

*To all whom it may concern:*

Be it known that I, THOMAS KERSHAW, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Doubling and Twisting Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a side elevation, partly in section; and Fig. 2 is an isometrical view of my improvements.

My invention has relation to means for lifting the drawing-roll frame and stopping the twisting-spindle of a doubling and twisting frame, commonly known as a "twisting-machine," when a strand of yarn breaks or a bobbin gives out; and my improvements consist in the peculiar construction, combination, and arrangement of parts, as hereinafter fully set forth.

Referring to the accompanying drawings, which represent a twisting-frame with my improvements applied, A is the creel; B B, the top drawing-roll; C, the lower drawing-roll, and D D the whirl for driving the spindle *d*. E is a frame, composed of two short parallel end bars, *e e*, which have bearings at $e^1$ $e^1$ on the main frame F of the machine, and two cross-bars, $e^2$ $e^3$, connecting said parallel bars *e e*. A shaft or drum, M, hereinafter more fully described, is journaled in the parallel bars *e e*, while the cross-bar $e^2$ has sockets or bearings $e^4$ for the trunnions of the drawing-roll frames G; and the cross-bar $e^3$ has similar sockets or bearings $e^5$ for the latch-frame, hereinafter described.

G is the drawing-roll frame, having trunnions *g g* resting in the open bearings $e^4$ on the cross-bar $e^2$, and having a rearwardly-extending arm, $g^2$, whose free end impinges against the latch-frame H. H is a supplementary frame, which I denominate the "latch-frame." There is one such latch-frame for each top roll, B. Said latch-frame consists of two side standards, *h h*, with a cross bar or shaft, $h^1$, and provided, if desired, with a handle, $h^2$. Said frames H H either have bearings on the cross-bar $e^3$, in which case they may be provided with trunnions $h^3$ $h^3$, which rest in sockets or boxes $e^5$, or else are swung on a rod, *f*, in either case having freedom of pivotal or swinging motion at their upper end toward the top roll, B, their lower ends turning as on a center on the trunnions $h^3$ or rods *f*.

I is a wire or rod connected to the free end of the arm $g^2$ by any suitable means, as by attachment to a button, $g^3$, on said arm, the lower end of said wire or rod being secured to the end of a lever, K, which is fulcrumed at *k* in a clamp, K′, secured to the top rail $A^2$, through which the spindles *d* pass. I′ is a spring for drawing down the rear end of the lever K, and $k^1$ is a shoe on the opposite end of said lever, arranged so as to come in contact with the under side of the whirl D whenever said lever is drawn down by said spring I′. $k^2$ is a shoe attached to the under side of the clamp K′, so that when the lever K is drawn down by the spring I′ the whirl D will be firmly griped both on its upper and lower surfaces by the shoes $k^1$ $k^2$. The drawing down of said lever K will produce a corresponding depression of the arm $g^2$, and thereby an elevation of the forward part of the drawing-roll frame G. The circumstances under which the whirl and its spindle will thus be stopped, and the top drawing-roll lifted simultaneously, will be presently described.

L L are trip-wires hung on the cross bar or rod $h^1$, so that when the yarns (shown at *x*) are, in a state of tension, passing through the eyes *l* of said trip-wires, the latter will be elevated, as shown at $x^1$ in Fig. 1; and when the yarns are not in a state of tension said trip-wires will be pendent or hanging downward, as shown at $x^2$ in Figs. 1 and 2.

M is a shaft or drum having bearings in the frame E, between the latch-frame H and the rest or fulcrum of the drawing-roll frame G. Said roller has a shoulder, *m*, formed by a groove or rib, and is caused to revolve by suitable mechanism in the direction of the arrow *y*.

$h^6$ is a spring secured in any suitable manner to the latch-frame H, and operating to push the said frame forward when the opposition of the arm $g^2$ is removed.

The operation is substantially as follows:

The yarns from the bobbins *a a* are passed through the eyes *l* of the trip-wires L, thence through the guide-eye G[1] on the drawing-roll frame G, between the drawing-rolls B and C, to the twisting-spindles *d d*. The top drawing-roll, B, being in contact with the lower roll, C, the arm $g^2$ resting on the shoulder $h^4$ of the latch-frame H, and the rear end of the lever K held up by the connection I, so that the shoe $k^1$ on said lever is depressed out of contact with the whirl D, the parts are in position to move. Motion being communicated to the rolls and twisting-spindles, the yarns *x* are brought to a state of tension, the trip-wires L being thereby elevated and retained in the position shown at $x^1$ in Fig. 1. This position they retain so long as the yarns continue unbroken, and none of the creel-bobbins run out. Should a strand of yarn break, or its bobbin run out, the trip-wire L, through which said yarn passed, will instantly drop, and its free end $l'$ come in contact with the shoulder *m* of the shaft or drum M. End-thrust will thereby be produced on such fallen trip-wire, causing the latch-frame H to be pushed back until the end of the lever $g^2$ clears the shoulder $h^4$ on said latch-frame H. The levers $g^2$ and K are then instantly drawn down by the force of the spring I′, thereby elevating the top drawing-roll, B, out of contact with the lower roll, C, and bringing the shoe $k^1$ into contact with the lower side of the whirl D, and the upper side of said whirl against the shoe $k^2$ on the clamp K′, causing an almost instant stoppage of the said whirl and of the spindle on which said whirl is secured.

When the broken strand is repaired, or the run-out bobbin replenished or displaced for a full one, the parts are restored to their normal operating position by bearing downward on the handle G[2] of the drawing-roll frame G until the rear end of the arm $g^2$ rises above the shoulder $h^4$ of the latch-frame H, and is made to rest thereon.

To facilitate the drawing back of the latch-frame H, when it is desired to lift the fallen trip-wire, the handle $h^2$, secured to said latch-frame, may be used.

If it be not desired to use some of the trip-wires of any particular top roll, said wires may be thrown back, as shown at $x^3$ in Fig. 2.

To keep the whirl D in motion, so as to avoid the friction of its belt on a stationary part, the arm $g^2$ is kept elevated, so as to impinge against the latch-frame H and above the shoulder of said frame when said trip-wires are idle and in position. (Shown at $x^3$ in Fig. 2.)

Should it at any time be desired to stop the drawing of any top roll, B, the threads or the yarns leading to said roll may be broken by the operator, and the trip-wires L thrown back into the position represented at $x^3$ in Fig. 2, where they are out of the way, the spindle D being left revolving.

The frame E, as already remarked, is fulcrumed in the main frame at $e^1$ $e^1$. It is provided with adjusting-screws $f'$ $f'$, whereby it may be elevated and lowered, as required, thereby raising or depressing the arm $g^2$ to its proper position with relation to the stop $h^4$ on the latch-frame H.

It will be observed that, though the drawing-roll frame G and latch-frame H are both sustained on the same frame E, an adjustment of said frame E will change or modify the relative positions of the frames G and H, because such adjustment will move the frame H vertically, while the frame G, being prevented from descending at its forward end by the lower drawing-roll, will maintain its horizontality and position.

I have shown and described the lever K as acting against the whirl D to stop the spindle; but, if desired, said lever may act directly against the spindle itself without the intervention of the whirl, which I regard and include as within the spirit of my invention.

What I claim as my invention is—

1. The frame E, composed of the parallel bars *e e* and the cross-bars $e^2$ $e^3$, having bearings $e^4$ $e^5$, in combination with the drawing-roll frame G and latch-frame H, as shown.

2. The pivoted or rocking drawing-roll frame G, having rearward extensions $g^2$, in combination with the frame E, supporting said drawing-roll frame, and the latch-frame H, substantially as shown and described.

3. In combination with the supplementary frame E, the upright latch-frame H, having a pivotal or swivel bearing thereon, and the trip-wires L, sustained upon the cross-bar $h^1$ of said latch-frame H, substantially as described.

4. The combination of the rocking drawing-roll frame G, having rearwardly-extending arm $g^2$, with swinging latch-frame H, having shoulder or stop $h^4$, upon which said arm directly impinges, and spring $h^6$, substantially as shown and described.

5. The combination of the whirl D with lever K and clamp K′, having shoes $k^1$ $k^2$, respectively, substantially as shown and described.

6. The combination of the rocking drawing-roll frame G, connection I, elbow brake-lever K, spring I′, and whirl D, said lever being constructed substantially as described, so as to impinge against the whirl when drawn down by the spring, as set forth.

7. The combination of the rocking drawing-roll frame G, having rearwardly-extending arm $g^2$, swinging latch-frame H, against which said arm directly impinges, pivoted lever K, and connection I, substantially as shown and described.

8. The combination of drum M, having shoulder *m*, with pivoted upright latch-frame H, sustaining pendent trip-wires L L and pivoted drawing-roll frame G, the parts being relatively arranged as described, whereby when one of said trip-wires falls its outer end will come in contact with shoulder *m*, causing latch-frame H to be pushed back and drawing-roll frame G to be released from engagement therewith, as set forth.

9. The combination of the rocking drawing-roll frame G, latch-frame H, trip-wires L, lever K, connection I, spring I′, and shaft M, having shoulder *m*, the several parts being arranged and operating, as described, to move said frame G and lever K, so as to lift the drawing-roll and stop the spindles, substantially as shown and described.

10. The combination of fulcrumed frame E with the adjusting-screws *f′ f′*, frame F, and supporting-frame of the machine, substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 9th day of July, 1878.

THOMAS KERSHAW.

Witnesses:
M. D. CONNOLLY,
CHAS. F. VAN HORN.