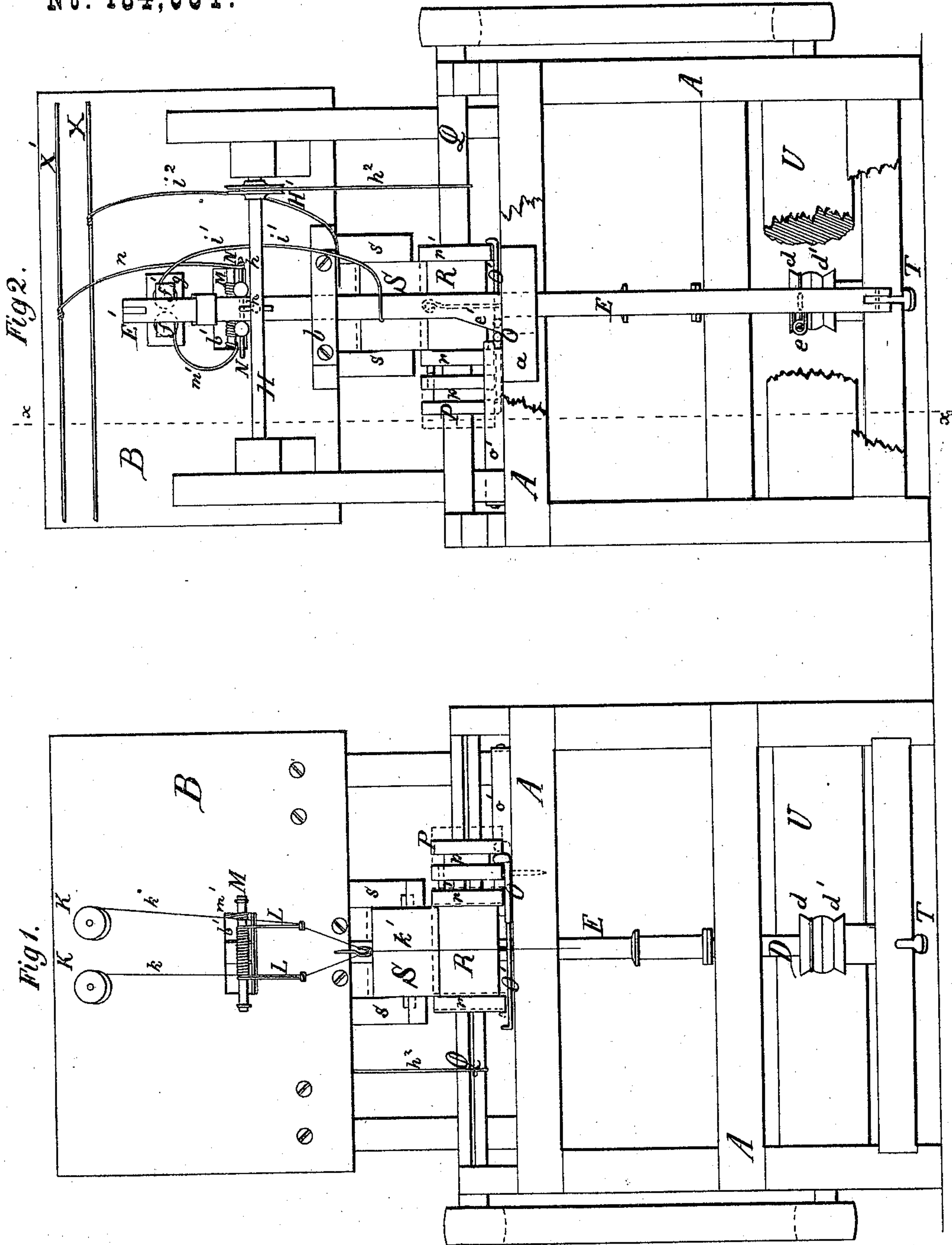


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ELECTRO MAGNETIC STOP MOTION FOR SPINNING AND TWISTING
MACHINERY

No. 184,034.

Patented Nov. 7, 1876.



Witnesses:
J. P. Theodore Lang
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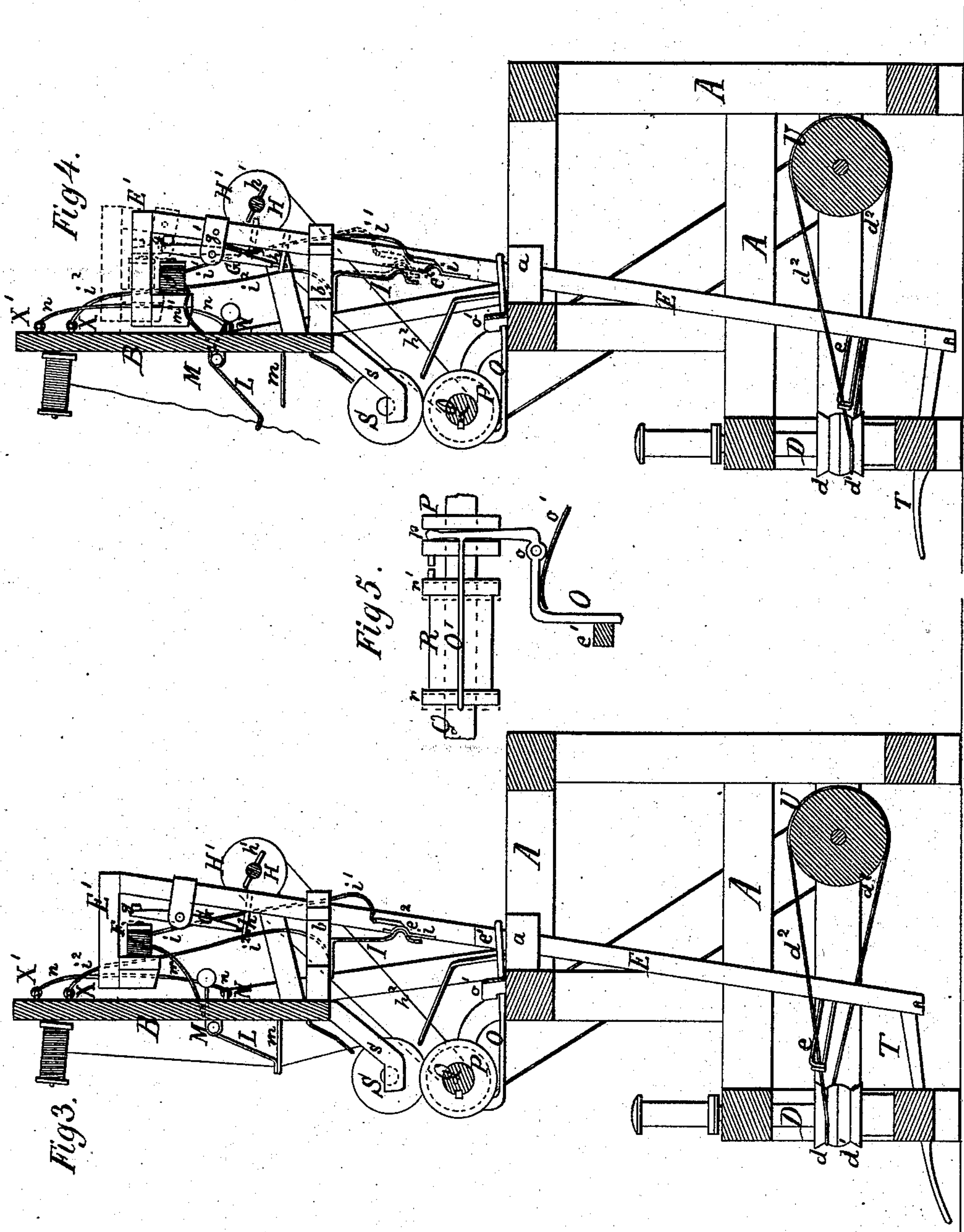
Inventor:
Henry A. Chapin
by
Mason, Hewitt & Sturges

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by
Marion R. Rickett & Lawrence

UNITED STATES PATENT OFFICE.

HENRY A. CHAPIN, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR OF
ONE-HALF HIS RIGHT TO CHARLES C. MOULTON, OF SAME PLACE.

IMPROVEMENT IN ELECTRO-MAGNETIC STOP-MOTIONS FOR SPINNING AND TWISTING MACHINERY.

Specification forming part of Letters Patent No. **184,034**, dated November 7, 1876; application filed
• March 14, 1876.

To all whom it may concern:

Be it known that I, HENRY A. CHAPIN, of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Cotton Thread or Yarn Doublers and Twisters, with an Electrical and Mechanical Stop-Motion; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Figure 1 is a front view of one of my improved machines. Fig. 2 is a back view of the same. Figs. 3 and 4 are vertical cross-sections in the line $x x$ of Fig. 2, exposing the operating parts in different operative positions; and Fig. 5 is a detailed view of a feed-roller brake and clutching device, forming part of my improvement.

My invention relates to a stopping mechanism for machines which manufacture cotton thread or yarn into twisted or double thread or yarn, or into woven or knitted fabrics—but it is more especially adapted for spinning and twisting machines; and it consists in certain constructions, combinations, and arrangements of parts, as will be hereinafter described and specifically claimed, whereby the feed-motion of a spindle, or of a set of spindles, or the motion of the spindle or spindles themselves, or both the said feed-motion and the motion of the spindle or spindles together, can be more quickly and safely stopped than by any of the known methods, and whereby a much cheaper and simpler apparatus of that class is produced than heretofore.

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

In the accompanying drawings, A represents a spinning-frame; B, a bobbin-board attached thereto; and E, a shipping-bar, retained in the frame and bobbin-board by guide-stays a and b , in which it slides.

The front part of the frame A supports a

spindle, D, in the usual way. The spindle D is provided, in place of the commonly-used whirl, with a tight whirl, d , and a loose whirl, d^1 , below the former. The rims of the said two whirls are reduced and rounded down where they meet, so that the driving-cord d^2 may be moved or easily changed from one to the other. The cord d^2 is shipped by a guide-arm, e , on the shipping-rod E, which has vertical or nearly vertical motion in the guides or stays a and b . The top of the shipping-rod E is provided with a head, E' , within which the coils $f f'$ of a magnet, F, and its armature g are secured. The said armature g is fastened to a spring-lever, G, which is pivoted at g' to the shipper-rod E, and has a bolt, h , loosely connected to its lower end. The said bolt h slides crosswise in the shipper-bar E, and when its free end is moved backward and outside the shipper-bar through the attraction of the armature g , by the magnet F, it is struck by the pin or cog h^1 on a revolving shaft, H. The said shaft H extends over the whole length of the bobbin-board, and is driven by aid of a pulley or whirl, H' , and a cord, h^2 , from any of the revolving shafts about the machine. The shipper-bar E is kept in its upper or normal position by aid of a notch, e^2 , and a detent-spring, I. The said notch e^2 is faced by a metal strip, i , which, by means of a wire, i^1 , is connected with the magnet-coil f' . The spring I is, near its base, connected by an electrical wire, i^2 , with one of the main electrical wires X, which runs along the upper part of the bobbin-board and furnishes the galvanic power from one of the poles of a battery. Each strand k of a bobbin, K, is passed through the eye of an over-balanced finger, L, on a fulcrum-wire, M, which finger is, by the tension of the strand, deflected downward against the stay m , whereby it is held steady. In case of the breaking of any strand, the respective fingers L L are freed, and their heavy ends, which protrude through a slot, b' , to the other side of the bobbin-board B, fall down upon a stop-wire, N.

The fulcrum-wire M is connected by a wire, m' , with the coil f , and the stop-wire N by a wire, n , with the main wire X', and, through

the same, with the other pole of the battery. The rod E has formed on it, near the stay *a*, a wedge, *e*¹, against which a lever, O, pivoted at *o*, Fig. 5, to the frame A, bears, by aid of a spring, *o'*. The lever O extends, on the other side of the pivot *o*, into the groove *p* of a clutch, P, on the feed-roller shaft Q. The feed-roller R is fitted loosely on the shaft Q, and has two end shoulders, *r r'*, between which a pressure-roller, S, is placed. The said pressure-roller S moves between journal-bearings *s*, which permit a lifting of the said pressure-roller as high as the shoulders *r r'* on the feed-roller. The lever O is also provided with a hook-shaped arm, O', by which the feed-roller R may be stopped from revolving by being caused to press laterally against the pressure-roller. The shipper-rod E is connected with a treadle, T, on the frame A, by which it is lifted to its normal position. The drum U serves to drive the spindles D through the cords *d*².

Operation: In the normal state of the machinery the shipper-bar E is raised, and the spring I bears in the notch *e*² of the said bar, thereby keeping the bar up. The fingers L are dipped down in front, resting on the stays *m*, thereby keeping the galvanic current or circuit open or interrupted. The wedge *e*¹ of the shipper E being elevated the lever O is moved against the spring *o'*, and the clutch P is thereby engaged with the feed-roller R, causing it to revolve with the shaft Q, and feed the yarn *h'* to the spindle D. The cord *d*² is on the upper or tight whirl *d*, and the spinning or twisting is performed in the usual manner. The armature *g* is off the magnet F, and the bolt *h* drawn inside of its bearing. As soon as a strand breaks the respective fingers L are released and dip down upon the stopping-wire N, thereby conducting the galvanic fluid from the main wire X' and the wire *n*, by means of the wire *m'*, through the coils *f f'*, and thence through the wire *i*¹, through the metal facing *i* in the notch *e*², through the spring I, and through the wire *i*² to the main wire X, or vice versa. The circuit is now closed, the magnet F attracts the armature, the bolt *h* slides partly beyond the back side of the bar E, and is struck by the revolving pin *h*¹. The bar E is thereby pushed down, the guide-arm *e* ships the cord *d*² down on the loose whirl *d*¹, and the spindle D is stopped. The wedge *e*¹ being moved out of the way of the lever O, this lever is moved by the spring *o'* against the bar E, and thereby removes the clutch P from the feed-roller R. The hooked arm O' now comes in contact with the roller R and pushes it against the end of the pressure-roller S with sufficient friction to cause it to be lifted before the moving-power of the feed-roller R is spent, thus causing the roller S to rise from its bed in the roller R and be held in position by the shoulder *r*, as seen in Fig. 4, and indicated by the dotted lines in Fig. 1, and the feeding of the unbroken strand or

strands belonging to the same set is thus discontinued. While the shipper-bar E is being pushed down the notch *e*², with its metallic facing *i*, leaves the spring I, thereby breaking the circuit by which the armature *g* was attracted to the magnet F, and thus the armature becomes disconnected, and the bolt *h* drawn back within the bar E. The bar E, after the broken strand is mended, may be moved up by aid of the treadle T, for the purpose of setting the spindle and feed-rollers in motion again. The guide-arm *e* now carries the cord *d*² up on the tight whirl *d*, the ascending wedge *e*¹ pushes the lever O aside and causes the clutch P to be re-engaged with the feed-roller R, and to move it back into its proper place, so that the pressure-roller may slip between the shoulders *r r'* and rest on the feed-roller proper. The fingers L become all deflected again and keep the circuit open. The spring I slips into the notch *e*² again, and thereby re-establishes the connection between the coil *f'* and main wire X.

If there are more than two strands to be united by spinning, each one of them must have a dipping-finger, L. If a combination of spindles is required to produce a certain kind of thread, the shipper-bar must be provided with one or more guide-arms, whereby all the cords for driving the said spindles may be shipped simultaneously, as then the whole system or set must be stopped when one strand breaks.

The described shipper-rod with the magnet-armature and the galvanic connections may be applied to any other machinery, by which yarn of all description is manufactured into woven, knitted, or other similar fabric, (as well as to spinning-machines,) so that the breaking of a single strand or yarn would be the cause of immediately stopping the whole machine.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A combined electrical and mechanical stop-motion for spinning or doubling-and-twisting frames, in which the shipping mechanism of the said frames is brought automatically into gearing position with the mechanical motor by the galvanic motor at the moment a strand or thread is broken, and thrown out of gear as soon as the shipping is effected, substantially as described.

2. A stop-motion for spinning or doubling-and-twisting frames, looms, knitting-machines, or other machines working fibrous material, wherein the shipper rod or lever has attached to it a magnet, armature, and a movable pin or catch, moved by electro-magnetic action, so that it will be thrown in the way of a mechanical movement on the machine, which, by moving against said pin or catch, shall move the shipper rod or lever and stop the machine or spindle, substantially as described.

3. The combination of the spring I and

notched piece \bar{v}^2 with their electrical connections, substantially as described.

4. The combination of the feed-motion, the shipper rod or lever, the electrical motor, and the mechanical motor, whereby the feed-motion is stopped at the moment a thread is broken, and started as soon as the shipper or lever is moved back to its normal position, substantially as described.

In testimony that I claim the foregoing as my own invention I affix my signature in presence of two witnesses.

HENRY AUGUSTUS CHAPIN.

Witnesses:

W. L. WARNER,
S. T. STEVENS.