2 Sheets—Sheet 1.

J. ARCHIBALD & H. HOLCROFT.

Machine for Making Spotted Yarn.

No. 217,193. Patented July 8, 1879.

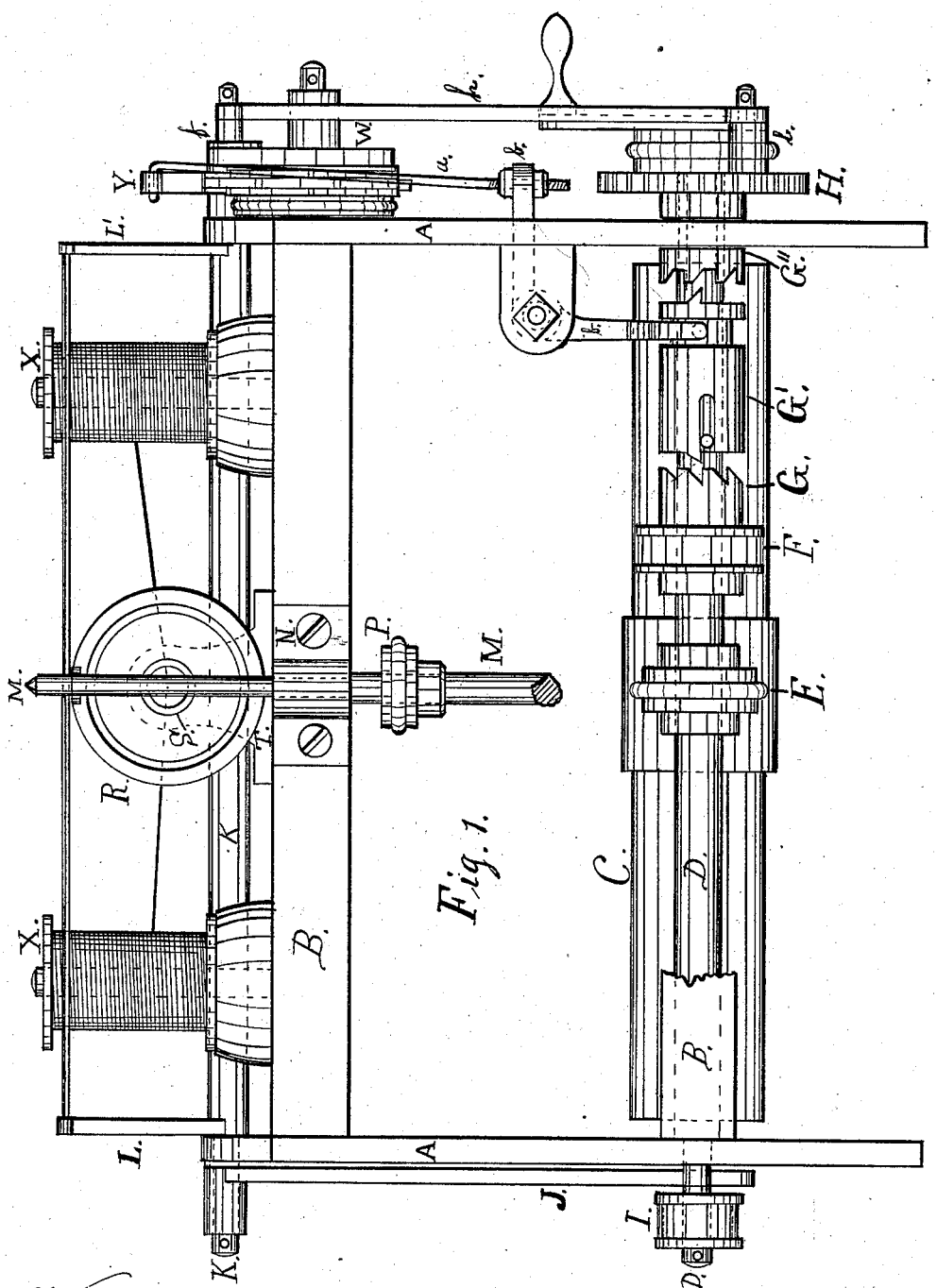

Fig. 1.

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Fig. 2.

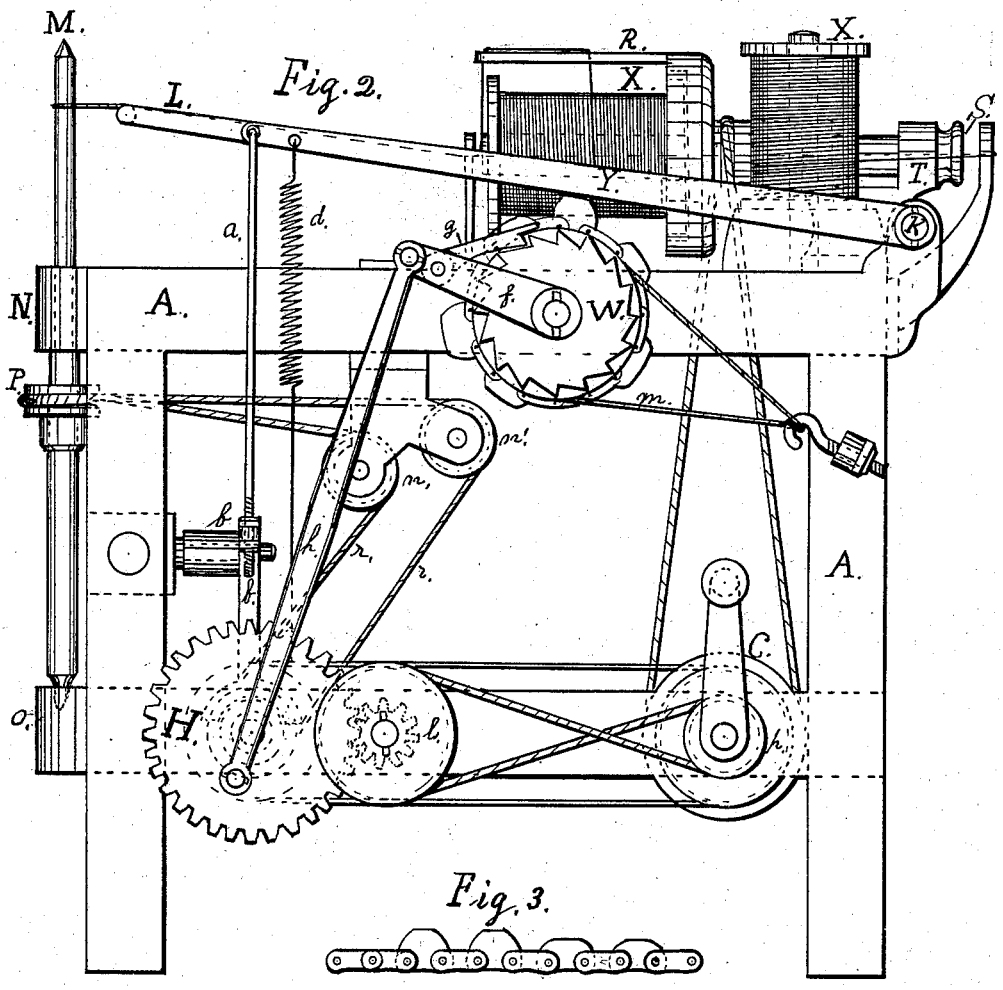


Fig. 3.

Fig. 4.

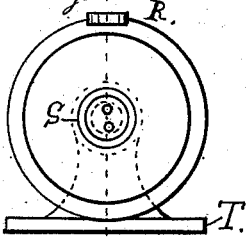


Fig. 5.

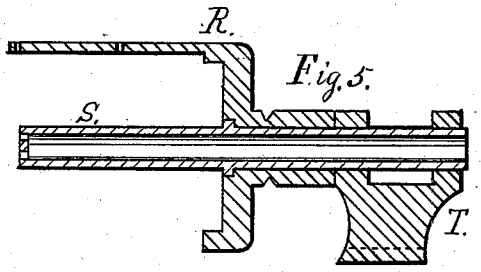
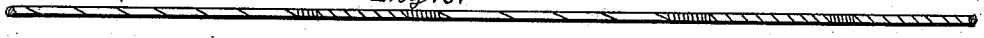


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN ARCHIBALD, OF PHILADELPHIA, AND HENRY HOLCROFT, OF MEDIA, ASSIGNORS OF ONE-HALF THEIR RIGHT TO DAVID R. JONES, OF PHILADELPHIA, AND CANBY S. SMITH, OF CHESTER, PENNSYLVANIA.

IMPROVEMENT IN MACHINES FOR MAKING SPOTTED YARN.

Specification forming part of Letters Patent No. **217,193**, dated July 8, 1879; application filed January 14, 1878.

To all whom it may concern:

Be it known that we, JOHN ARCHIBALD, of the city of Philadelphia and State of Pennsylvania, and HENRY HOLCROFT, of Media, Delaware county, and State of Pennsylvania, have jointly invented a new and useful Improvement in Machines for Doubling and Spotting Twisted Yarns, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 is a front view of our improved machine. Fig. 2 is an end view of the same. Fig. 3 is a view of a section of the pattern-chain. Fig. 4 is a front view of the flier, tube, and stand. Fig. 5 is a sectional view of the same. Fig. 6 is a view of a corded thread, showing the spots and twists.

Similar letters of reference in the drawings refer to like parts.

The object of our invention is the construction of a machine which in operation will be capable of doubling two or more threads of yarn, and twisting or lapping them into a cord or thread, which twisting or lapping shall be varying and irregular, so as to cause the lapping thread to be wound on a central thread or threads in different quantities at different points, and, when threads of different colors are used, will produce a lapped thread variegated in appearance.

Our invention consists in the combination, with drawing-off and winding mechanism, of a pattern device for operating friction or other clutches, by which the drawing off and winding shall be performed at varying speeds, which are controlled by the pattern device, as will be hereinafter described.

The construction of our invention is as follows: A represents the frame of the machine, which may be made of cast-iron; B, the rails, which may be made of wood or cast-iron. In this frame we put a drum, C, and shaft D, and on the shaft D we fix a grooved pulley, E, and a loose band-pulley, F, the hub of the latter being constructed so as to form the ratchet-tooth clutch G. Upon the same shaft is a sliding sleeve, G′, in each end of which are formed ratchet-teeth, and that is free to slide on the shaft. A small pin fixed in the shaft D, and fitted to engage in a slot in the sleeve G′, makes the sleeve and shaft revolve together. The clutch G″ is formed on a sleeve fitted on the end of shaft D and extending through the frame A, and to it is fixed the spur-wheel H. K is a shaft, to which is fixed two arms, L L′, to the opposite or free ends of which is fixed a guide-wire, which is made, by any suitable mechanism, to traverse the thread while being wound on the spindle M.

The spindle M is fixed to the frame by the bolster N and step O. On this spindle is a small grooved pulley, P. R is a flier, fixed to a tube, S, which is supported in the stand T. Fixed to the head of the flier is a small grooved pulley, and the leg of the flier is pierced with two holes, one about the center and the other at the end.

On a stud fastened to frame A is fitted a ratchet-and-flange wheel, W, on the flange part of which is fitted to work a plate-link chain, as shown in Fig. 3. On this chain rests the lever Y. This lever is connected by a rod, *a*, to the bell-crank lever *b*, one of the arms of this lever being made fork-shaped, so as to fit into a groove in the sleeve or clutch G′. The lever Y is kept down on the chain by the spiral spring *d*, and through the action of this spring and the projections on the pattern-chain the clutches G, G′, and G″ will be engaged and disengaged. Upon the stud on which is placed the chain-wheel W is fitted a loose arm, *f*, to which is connected a pawl, *g*. The arm *f* is connected to wheel H by rod *h*.

On the end of the shaft of drum C is fixed a grooved pulley, *p*, from which runs a cross-band to pulley *l*, on which latter is fixed a small pinion-wheel, that engages with wheel H that is fast on the sleeve, and so drives the clutch G″. (See dotted lines, Fig. 2.) The band *r*, for driving the spindle M, is run over two carrier-pulleys, *n n′*. (See Fig. 2.) The pattern-wheel W is provided with a friction cord or strap, *m*.

The operation is as follows: The spools X X X are provided with the yarn that is to be doubled, twisted, and spotted. The yarn from the two spools set on the vertical spindles are carried through the tube S and fastened to the

spindle M. The lapping yarn or thread from the spool on the tube S is carried through the center hole in the leg of the flier R, and then through the hole in the end of the leg, and fastened to the threads passing through the tube S. Motion is communicated to drum C, and from it by the band shown in Fig. 2 to the flier R, which, as it revolves, carries the thread from the flier around the center thread or threads. The pulley *p* on shaft of drum C, by the band shown in Fig. 2, communicates motion to pulley *l*, which transmits it through the small pinion-wheel to the spur-wheel H, and this, by the connecting-rod *h*, to the arm *f*, which operates the pawl *g*, and at each revolution of the wheel H will move the ratchet-wheel W one tooth and the pattern-chain one link.

The lever Y in Fig. 2 is shown as resting on one of the links of the chain having the greatest lift. This, through the connecting-rod *a* and bell-crank lever *b*, will engage the clutches G′ and G″, and these clutches will remain engaged until the chain presents a link with a short lift or a link without lift. The clutches G′ and G″ having been engaged by the pattern-chain and connecting mechanism, the shaft D will be rotated through the wheel H, pulleys *l* and *h*, and pinion, and a slow motion will be communicated thereto, and, by means of the pulley E and band *r*, a corresponding motion will be communicated to the spindle M, which will slowly draw off the yarn through the tube S, and the thread from the flier will be wound around the central thread in form of a spiral or twist. The next revolution of wheel H will move the pattern-chain one link, and the spring *d* will draw the lever Y down on the short-lift link of the pattern-chain. This will disengage the clutches, and the shaft D and spindle M will stand still and the flier R will continue in motion, and will lap the winding thread closely, forming on the central thread a well-defined spot.

The next movement of the pattern-chain will cause the lever Y to drop and rest on a plain link of the chain. This will connect the clutches G and G′, and the shaft D will be driven by the band upon the drum C, and spindle M will be rotated at a much faster speed than when the shaft is driven by the wheel H, and the coils of the lapping thread will be wound on the central thread farther apart, showing a different twist or spiral from that lapped by the slow speed.

The changes in the speeds and stops may be made at each revolution of the wheel H, and each or any one of them may be continued as long as desired simply by arranging the lifts in the chain as shown in Fig. 3.

In place of a chain having raised links a pattern-chain with movable screws of different lengths may be used, the same as is now used, to control the movements of double shuttle-box motions in power-looms.

In place of a chain, a wheel having movable pins, or a ratchet-wheel to which is fixed a flange with raised projections, may be used; but in the latter case a wheel or flange will be required for each pattern desired to be produced on the thread. For this reason we prefer a chain with movable links or screws, which may be readily altered to suit both length and design of pattern desired.

In some cases it may be desired to fix the tube S in the stand T and revolve the flier on the fixed tube, and have one end of the tube fitted with a plug in which a small hole is pierced for each of the central threads. This will prevent the lapping thread from twisting the central threads, and will cause the lapping thread to be laid on the central thread in a more satisfactory manner.

It may be desirable to make the small pulley drive the flier by a clutch-connection.

The drawings show only one spindle and one flier; but it is understood that one pattern-chain and one pair of clutches may operate a number of fliers and spindles; and, also, one or more threads may be used to form the central thread; and the machine may be fitted with a suitable traverse motion; and the twisted and spotted yarn may be wound on a shuttle-bobbin placed on the spindle M; and the yarn may be used as filling direct from the machine, or the yarn may be wound on large spools, as desired.

Other modifications may be suggested by which our invention may be operated; but in principle it remains the same.

We are aware that it is not new to lap a thread around a central thread in different quantities at different points. This we do not claim; but

We claim—

A pattern-chain or a pattern device which shall be capable of adjustment and alteration, in combination with the operating-clutches G G′ G″ and a mechanism for drawing off and winding a central thread or threads, and devices for lapping a second thread thereon in different quantities at different points, as shown and described.

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