(No Model.) 5 Sheets—Sheet 1.

J. DART & W. I. LEWIS.

YARN HANKING MACHINE.

No. 388,267. Patented Aug. 21, 1888.

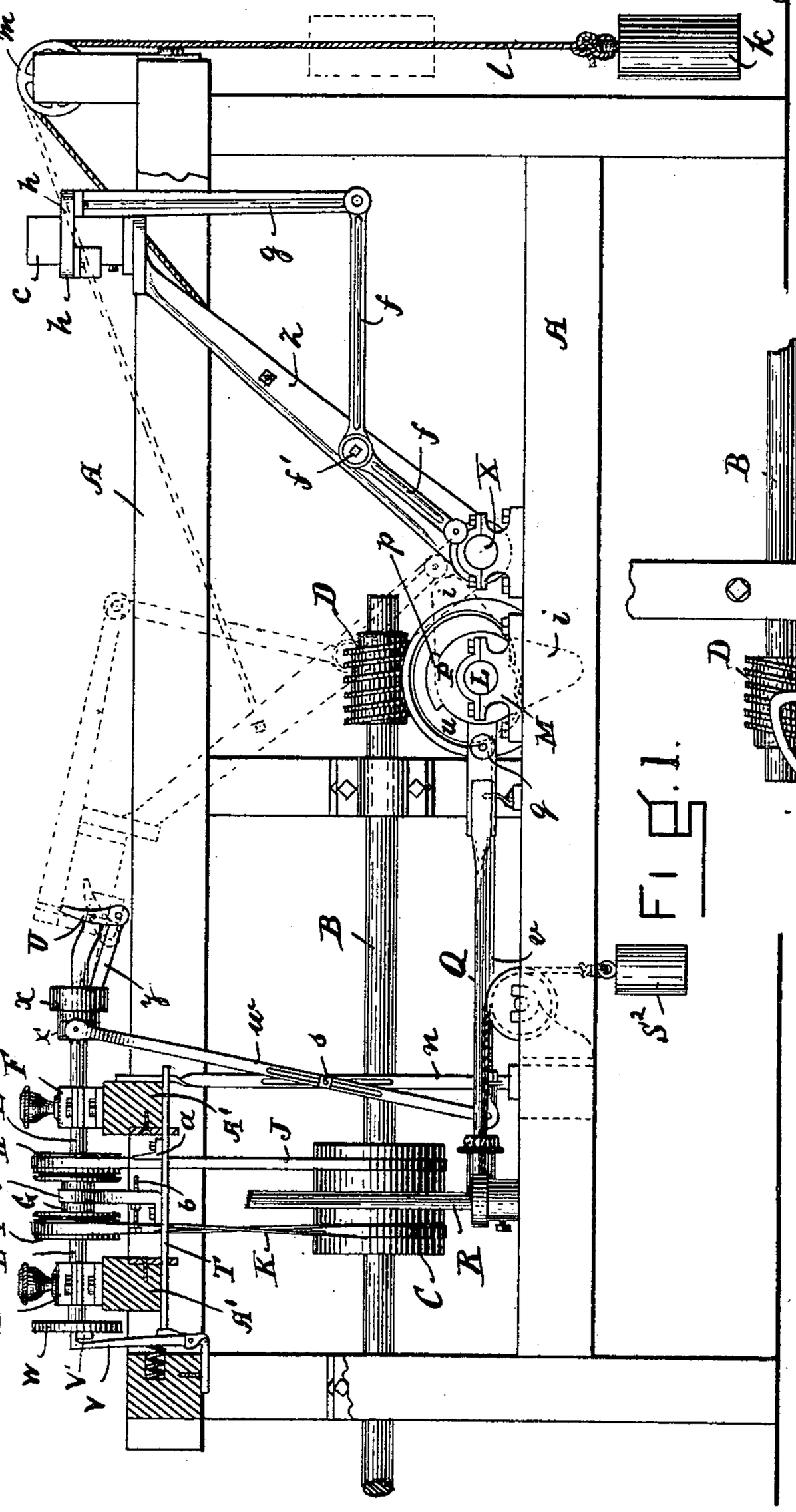

FIG. 1.

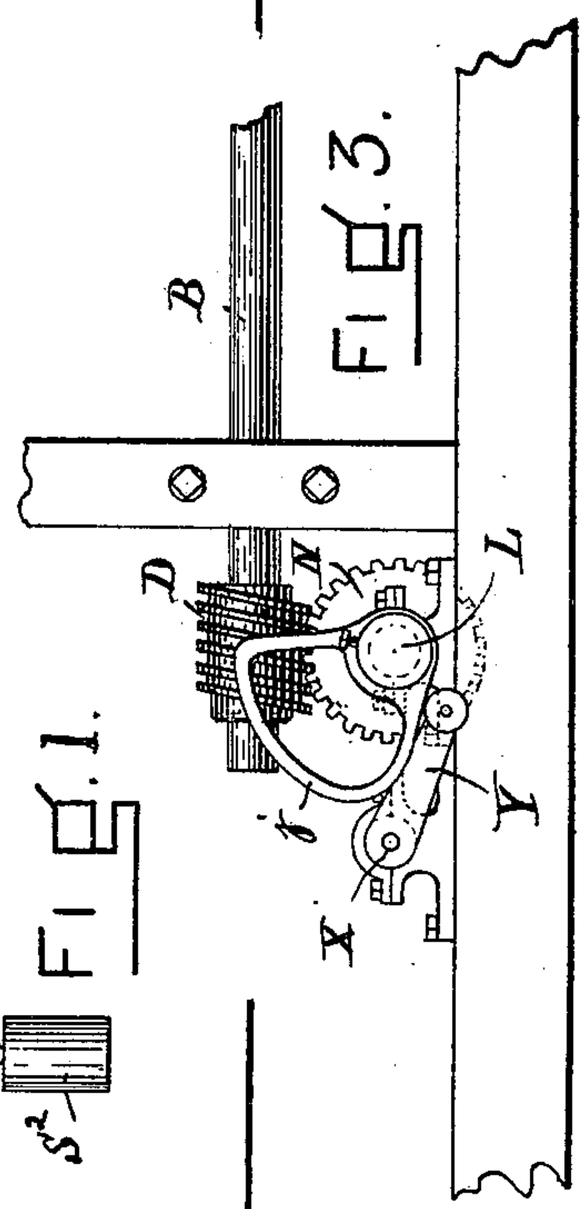

FIG. 3.

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(No Model.) 5 Sheets—Sheet 2.

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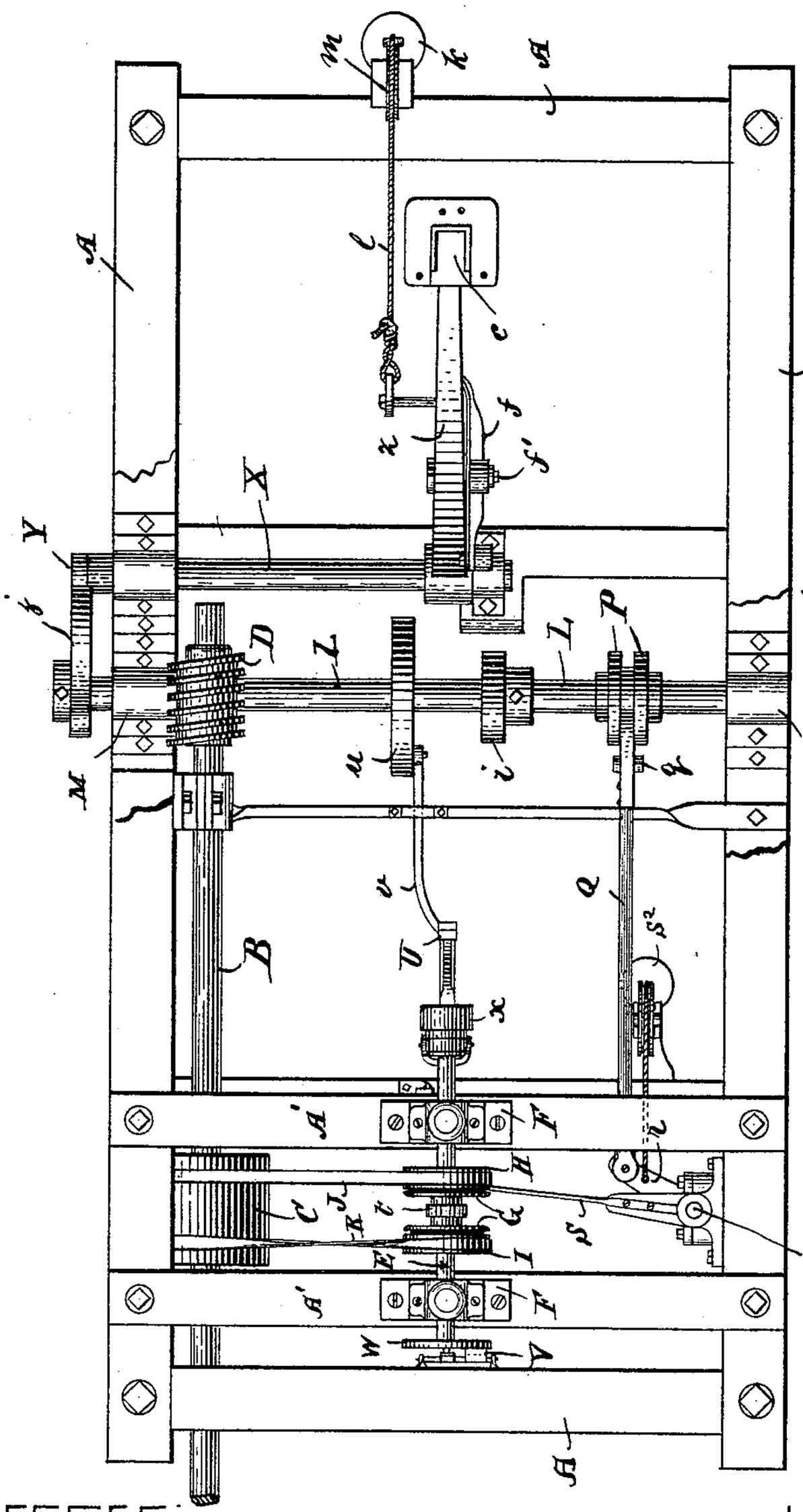

FIG. 2.

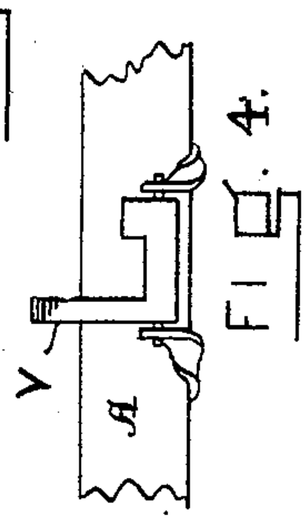

FIG. 4.

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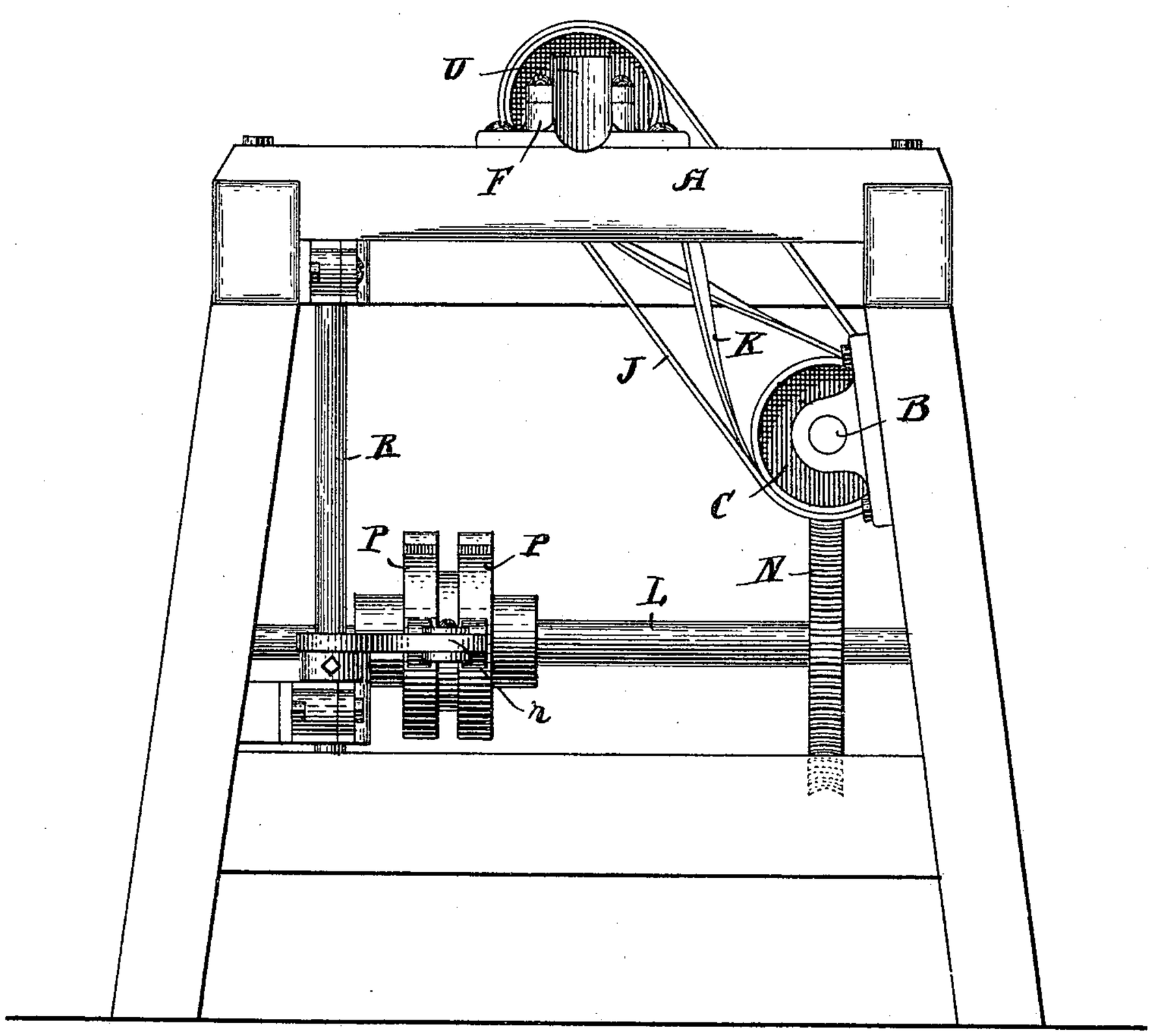

FIG. 5.

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5 Sheets—Sheet 4.

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YARN HANKING MACHINE.

No. 388,267. Patented Aug. 21, 1888.

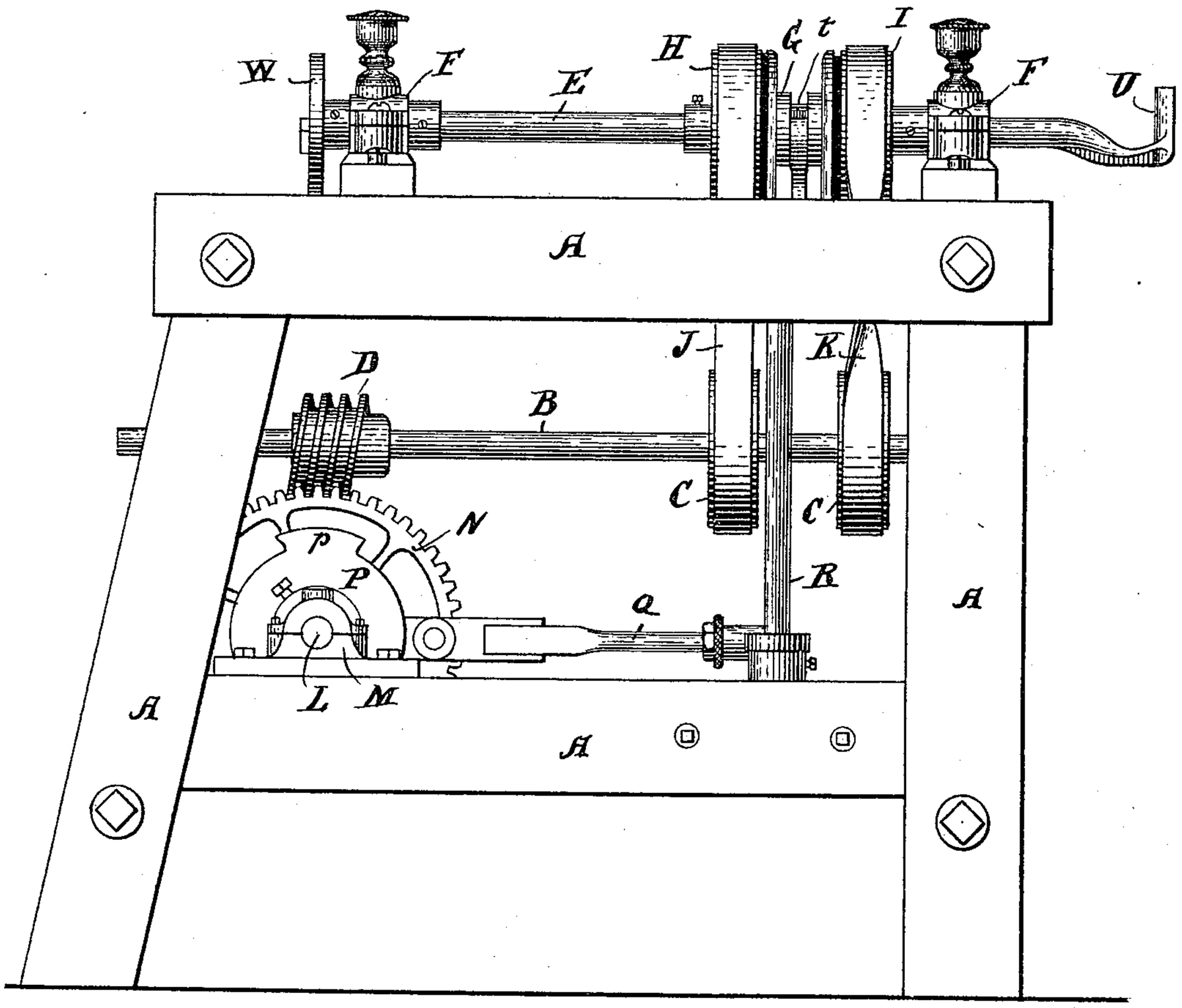

FIG. 6.

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(No Model.) 5 Sheets—Sheet 5.

J. DART & W. I. LEWIS.

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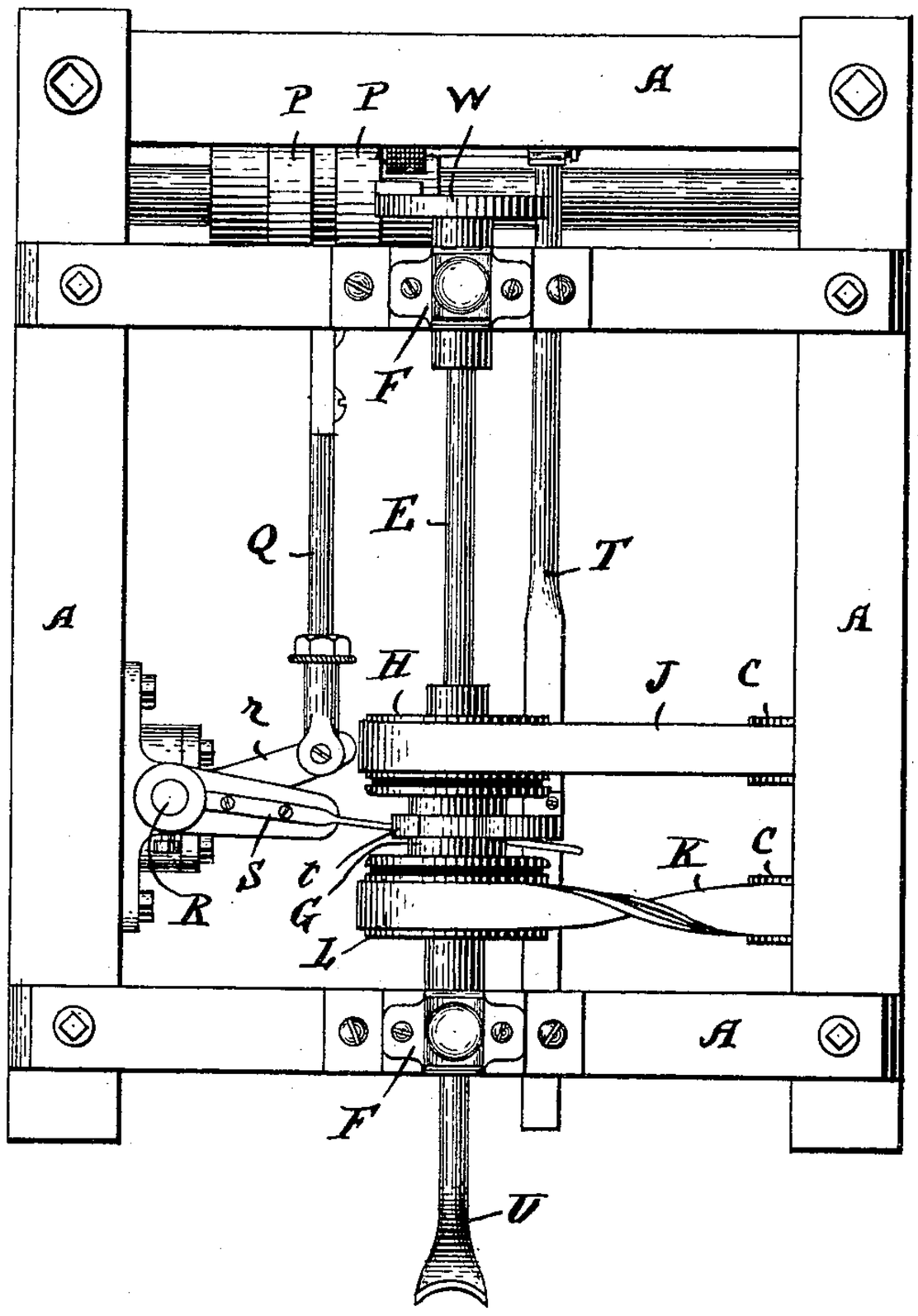

Fig. 7

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UNITED STATES PATENT OFFICE.

JOSEPH DART, OF BROOKLYN, NEW YORK, AND WILLARD I. LEWIS, OF WALPOLE, MASSACHUSETTS; SAID LEWIS ASSIGNOR TO SAID DART.

YARN-HANKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 388,267, dated August 21, 1888.

Application filed July 2, 1887. Serial No. 243,258. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH DART, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, and WILLARD I. LEWIS, a citizen of the United States, residing at Walpole, in the county of Norfolk and State of Massachusetts, have invented new and useful Improvements in Yarn-Hanking Machines, of which the following is a specification.

The object of our invention is to produce a machine for twisting and hanking skeins of yarn by imparting a certain number of revolutions to one end of the skein while the other end is held stationary, and then causing the two ends to be brought together, so that one end of the skein can be passed through the other, thus securing the hanks.

The invention consists of certain details of construction, hereinafter fully described, and pointed out in the claims.

Referring to the accompanying drawings, Figure 1 represents a side view of a twisting and hanking machine embodying our invention with a portion of the side frame broken away. Fig. 2 is a plan or top view of the same. Figs. 3 and 4 are detail views. Fig. 5 shows a front view of a modification of our machine. Fig. 6 is a side view, and Fig. 7 is a plan or top view, of the same.

A represents the frame of the machine; B, the driving-shaft, mounted in suitable bearings secured to one side of the frame A. Upon this shaft is mounted a pulley, C, and at its outer end is secured a worm, D. A continuous rotary motion is imparted to the shaft B by any suitable means. (Not shown in the drawings.)

E is a shaft mounted in bearings F F, secured to cross-bars A′ A′ upon this shaft, and between the bearings F F are mounted a double friction-flange, G, and two pulleys, H and I. The pulleys H and I are loose upon the shaft E and are driven by belts J K from pulley C on shaft B, the belt K being crossed, so as to cause the pulleys H and I to turn in opposite directions. The double friction-flange G is secured to the shaft E by a feather and groove, so that it can be shifted into contact with either of the pulleys H or I, as required, by the following mechanism, viz:

A shaft, L, is mounted in suitable bearings, M, on the frame A. Motion is imparted to this shaft from the driving-shaft B through worm D and worm-wheel N. (See Fig. 3, which is a view of the other end from that shown in Fig. 1 of the shaft L and its connections.) Upon this shaft L is secured a double cam, P, that actuates a lever, Q, by coming into contact with a pin, *q*, on one end of said lever, the outer end being secured to an arm, *r*, on a rocker-shaft, R, which is provided at its upper end with a spring-lever, S, that operates a slide, T, (see Fig. 1,) provided with a fork, *t*, that fits in a groove in the middle of the double flange G. The end of the spring-lever S passes between a stud, *a*, secured to the slide T, and a screw, *b*, that passes through the fork *t*, so that by adjusting the screw *b* more or less friction between the double flange G and the pulleys H I is obtained.

The cam P, by means of its connections, as above described, causes the friction-surface of the flange G to come into contact with pulley I, which imparts a rotary motion to the shaft E, and this motion continues until the elevated surface *p* of cam P passes the pin *q* on the lever Q, when the spring-lever S is drawn back by means of a weight, S^2, and causes the other side of the double friction-flange G to come into contact with the pulley H, thereby imparting an opposite motion to the shaft E. The object of this reverse motion is to assure the stopping of the shaft E at the same point, so as to bring the hook U, which is on one end of said shaft, in an upright position when stopped, a spring-pressed pawl, V, previously held back by the slide T pressing against it, coming into contact with a projection, V′, on a flange, W, on the other end of the shaft E and arresting its backward motion. When the rocker-shaft R is turned back, the slide T will release the pawl V. An end view of the pawl V is shown in Fig. 4. When the shaft E is held from rotation by the pawl V, the pulley H slips upon the friction-flange G.

X is a rocker-shaft mounted in suitable bearings on the frame A, and is provided at its outer end with a crank, Y, (see Figs. 1 and 3,) that is operated by means of a cam, *j*, mounted upon the end of the shaft L. To this shaft X is also secured a long lever, Z, that supports a

hollow box or form, *c*, on which one end of the skein of yarn is to be placed, the other end being passed over the hook U on the end of shaft E.

f is a bell-crank fulcrumed to the lever Z at *f'*, to the outer end of which bell-crank is connected a rod or lever, *g*, to the upper end of which is secured a slide, *h*, that embraces the form *c*. The lower end of the bell-crank is provided with a pin or stud that is operated upon by a cam, *i*, on shaft L.

When the cam *j* on the shaft X comes into contact with the crank Y, it will cause the rocker-shaft X to turn, and with it the lever Z, and throw the box or form *c* over the hook U, as shown in dotted lines in Fig. 1. At the same time the slide *h* will be driven forward by the cam *i* on the shaft L coming in contact with the lower end of the bell-crank *f*, thereby raising the upper end of the bell-crank *f* and lever *g* and pushing the yarn off the box or form *c* onto the hook U. When the cam *j* has passed the crank Y, the lever Z will be drawn back by the weight *k*, attached to the lever Z by cord *l*, that passes over a pulley, *m*, and the various parts assume their original positions.

The hook U is simply a bifurcated bar pivoted at or about its center to the flattened end of the shaft E, and having its lower end connected to the sleeve *x* by a short rod, *y*, so that the sliding back of the sleeve *x* causes the hook U to assume a horizontal position, as shown in dotted lines in Fig. 1. The object of bringing the hook U to a horizontal position is to enable the end of the skein on the box *c* to pass over the end of the skein on the hook U, and also to facilitate the removal of the skein from the hook U. When the box or form *c* is thrown over onto the hook U, the latter is caused to assume a horizontal position, as shown in dotted lines in Fig. 1, by means of a grooved cam, *u*, mounted upon the shaft L, operating a lever, *v*, connected to the lower end of an upright lever, *w*, fulcrumed on a bar, *n*, at *s*, the upper end of the lever *w* being connected to a sliding sleeve, *x*, on the shaft E, which sleeve is connected by a bar, *y*, to the lower end of the hook U, as shown. The sleeve *x* revolves with the shaft E, being splined thereto, and the lever *w* is attached at its upper end to the projection on the collar *x'*, which fits around the sleeve *x*, this collar, while allowing the sleeve *x* to rotate freely, moving the sleeve with it along the shaft E. The number of revolutions to be made by the hook U can be regulated by adjusting the double cam P—that is, by causing the elevated surfaces *p* of the double cam P to overlap more or less, so that their action on the pin *q* on end of lever Q will continue for a longer or shorter time. The double cam P consists of two disks, each provided with a raised or elevated surface, *p*, so that by overlapping the raised surface more or less the duration of the forward rotation of the shaft E is continued for a longer or shorter period.

The operation of the machine is as follows: One end of the skein is placed over the hook U and the other over the box or form *c*. The shaft E is then started and continues in motion until a sufficient twist is imparted to the warp or yarn. The shaft is then stopped with the hook U in an upright position, and the cam *j* then tips the long lever Z until the form *c* passes over the hook, which now assumes a horizontal position, as before described. The slide *h* now pushes the warp or yarn from off the box or form *c* onto the hook U, which, when the box or form *c* is drawn back again, assumes its upright position with the two ends of the warp upon it, which is then removed by hand.

In the modification shown in Figs. 5, 6, and 7 only a portion of the mechanism is employed, one end of the warp or yarn being held by the machine, while the other end is held by the operator, so that the required twist is given to the warp or yarn. All the parts employed are the same as those before described, excepting the hook U, which is in this case of the form shown in Figs. 6 and 7—that is, with an enlarged or broad end with its front surface concaved, so as to adapt it to spread the end of the warp or yarn to facilitate the passing of the end held by the operator through the end held on the hook U.

What we claim as our invention is—

1. The shaft E, provided with hook U, in combination with the double friction-flange G, pulleys H and I, belts J and K, pulley C on the driving-shaft B, the pawl V, and flange W, provided with a projection, V', substantially as and for the purposes set forth.

2. The combination of the shaft B, worm D, worm-wheel N, shaft L, double cam P, lever Q, provided with pin *q*, rocker-shaft R, spring-lever S, double friction-flange G, weight S^2, arm *r*, shaft E, and pulleys H I, substantially as and for the purposes set forth.

3. The lever Z, provided with the box or form *c*, shaft X, and crank Y, in combination with the cam *j* on shaft L, substantially as and for the purpose set forth.

4. The bell-crank *f*, lever or rod *g*, and slide *h*, in combination with the lever Z, box or form *c*, and cam *i* on shaft L, substantially as and for the purpose set forth.

5. The combination of the cam *u* on shaft L, the rods or levers *v w*, shaft E, sliding sleeve *x*, connecting-rod *y*, and the hook U, substantially as and for the purpose set forth.

6. In a twisting and hanking machine, the combination of the shaft B, having pulley C, the shaft E, having a double friction-flange, G, feathered thereon, the pulleys H and I, loosely mounted on the shaft E, the belts J K, the hook U, mounted upon the end of the shaft E, and means, substantially as specified, to engage either of the pulleys with the flange G, substantially as described.

7. In a twisting and hanking machine, the combination of the rotary shaft E, the hook U, mounted on said shaft and adapted to carry

one end of the skein of yarn or warp, a hollow form or box, *c*, adapted to carry the other end of the yarn, a lever upon which said box is mounted, and means, substantially as specified, for automatically actuating said lever to cause the box *c* to advance and pass over the hook U, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOSEPH DART.
WILLARD I. LEWIS.

Witnesses:
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E. PLANTA.