(No Model.) 2 Sheets—Sheet 1.

J. W. EISENHART.

TENSION DEVICE FOR LOOM SHUTTLES.

No. 460,723. Patented Oct. 6, 1891.

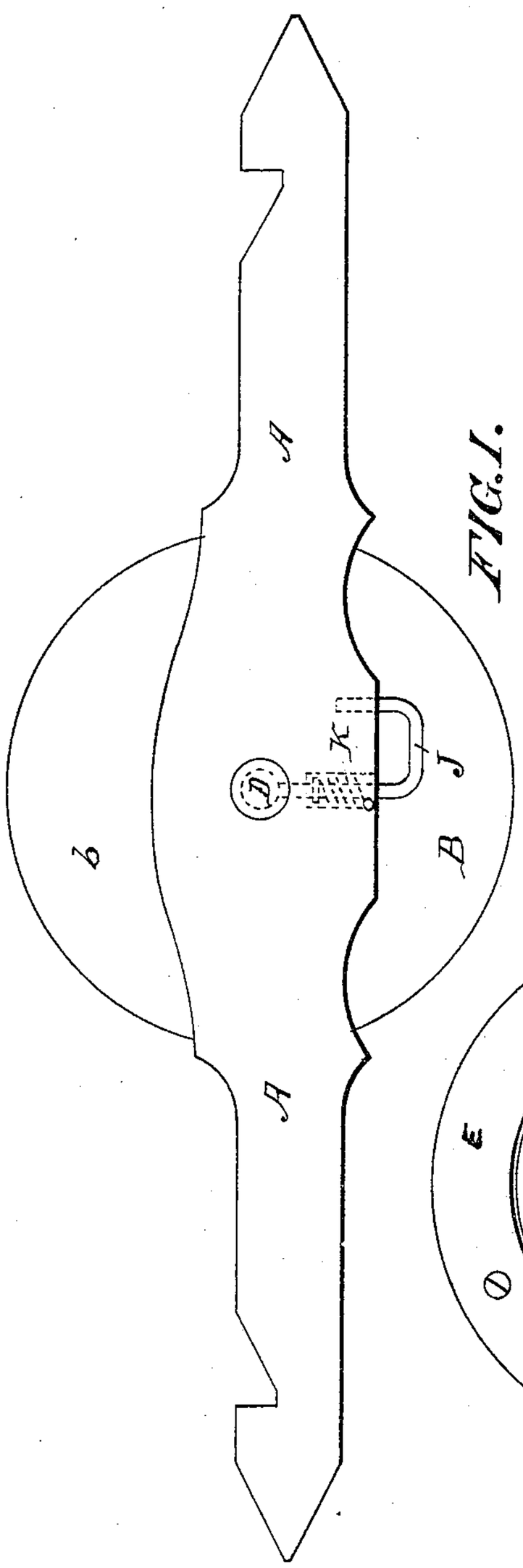

FIG. 1.

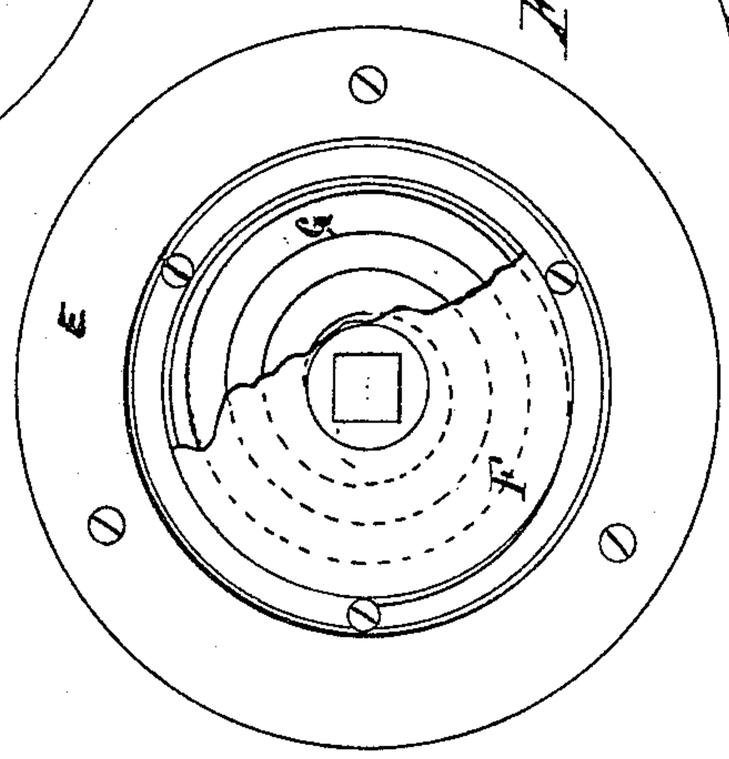

FIG. 3.

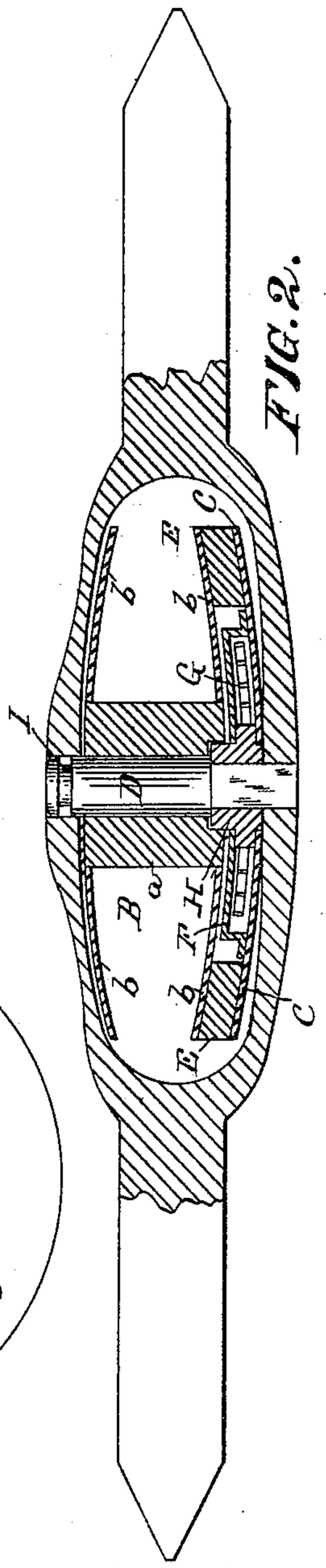

FIG. 2.

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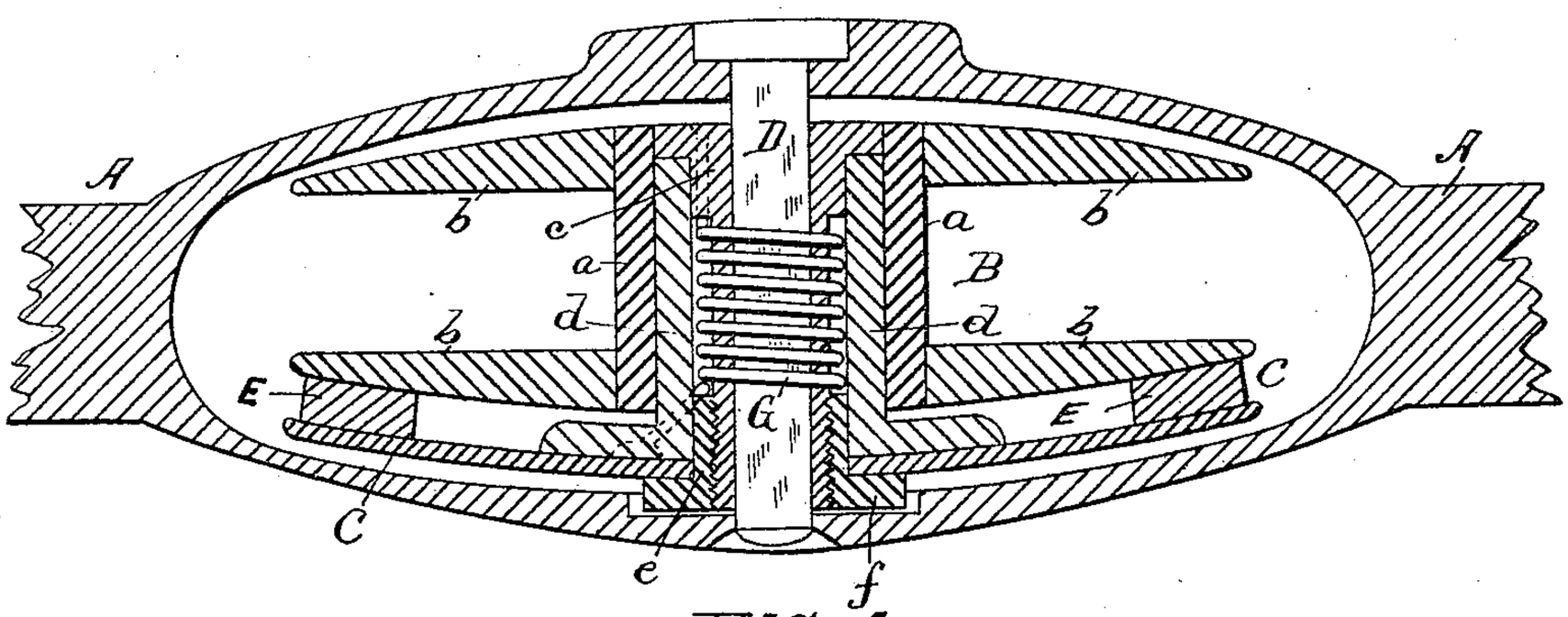

FIG. 4.

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UNITED STATES PATENT OFFICE.

JOHN W. EISENHART, OF YORK, PENNSYLVANIA.

TENSION DEVICE FOR LOOM-SHUTTLES.

SPECIFICATION forming part of Letters Patent No. 460,723, dated October 6, 1891.

Application filed June 23, 1891. Serial No. 397,200. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. EISENHART, a citizen of the United States, and a resident of York, in the county of York and State of Pennsylvania, have invented certain new and useful Improvements in Tension Devices for Loom-Shuttles, of which the following is a specification.

My invention relates to improvements in loom-shuttles; and the object of my invention is to furnish an automatic tension and slack-taking device for bobbins or spools in loom-shuttles.

In the operation of loom-shuttles as ordinarily constructed the spool or bobbin acquires such a momentum during its passage across the loom that it continues to unwind after having reached the end of each passage, and the thread or wire is liable to become entangled and seriously interfere with the action of the shuttle. Various attempts have been made to overcome this defect by friction-brakes acting upon the periphery of the spool and by friction-bands carried by the spool; but these devices have been but partly successful.

My device consists of a plate of metal which carries a friction-washer, against which one of the sides of the spool or bobbin bears, and of a spring, one end of which is attached to a hub, through which the spindle of the spool or bobbin passes and which is immovable on this spindle, and the other end of which is attached to the metal plate, which carries the friction-washer.

My invention consists, further, in certain details of construction, as fully described hereinafter.

In the accompanying drawings, forming part of this specification, and in which similar letters of reference indicate similar parts throughout the several views, Figure 1 is a plan view of my loom-shuttle and spool; Fig. 2, a central sectional elevation of the same; Fig. 3, a plan of the friction-washer plate and its connected parts, and Fig. 4 a sectional elevation of a modification of my invention.

A is the shuttle; B, the bobbin or spool; C, the friction-washer plate; D, the spool-spindle.

The spool is substantially the same as that generally in use. It consists of a barrel *a* and heads *b b*.

The friction-washer plate C carries the friction-washer E, which is an annular piece of leather or other suitable material, with its greater diameter equal, or nearly equal, to the diameter of the spool or bobbin.

F, Fig. 2, is a hollow case carried by friction-washer plate C, which incloses a coil-spring G, one end of which is attached to a hub H, which passes through friction-washer plate C and case F, and the other end of which is attached to the plate C.

That part of the spindle D upon which the spool revolves is round, and the part that passes through the hub H and shuttle-body A is square, this hub having a squared hole to receive the spindle. The hub is consequently fixed and held in place by the spindle, while the friction-plate may turn upon the hub, being only limited in its movements by the resistance of spring G.

When the shuttle reaches the end of its stroke or passage, the tendency of the spool is to keep on revolving, owing to the momentum which it acquires by the thread or wire being drawn off it during its passage across the loom. This revolving is entirely prevented by the combined action of the friction-washer E and the spring G. The operation of these parts is as follows: The lower head of the spool rests upon the friction-washer E, which is carried by friction-plate C and which with this plate can turn on hub H. One end of spring G is attached to plate C and the other to hub H. As the spool is revolved, the friction causes the washer E and plate C to be revolved with it, winding up coil-spring G until the tension of this spring overcomes the friction, when the spool continues to revolve while the shuttle is making its passage and the wire is being drawn off it. As soon as the shuttle reaches the end of its passage and the strain is taken off the wire, the spring asserts itself to revolve the friction-plate and washer in the opposite direction, and the friction between the washer E and the spool causes the spool to be turned, so that the slack of the wire or thread is wound upon it.

By my arrangement the tension on the wire leaving the spool is automatically adjusted, so that all the wire on the spool may be used.

When the spool is full of wire, its greater weight causes a greater friction between the spool and the friction-washer E; but the diameter of the coil of wire on the spool is large, and as the wire is drawn off from the outside of the coil the leverage is great and the friction is easily overcome. As the wire is drawn off, the diameter of the coil decreases and the leverage becomes smaller; but the weight, and consequently the friction, also decrease, and the tension on the wire is always practically the same. With a full spool the momentum is greater than with a partly full one; but with a full spool the winding of spring G is greater than with a partly full one, and hence the slack, which is greater with a full spool, owing to the greater momentum, is perfectly taken up in all cases.

Heretofore it has not been possible, in wire looms at least, to use all the wire upon the spool, because the friction devices were such that there was as much friction on an empty spool as upon a full one, and as the leverage of the wire is so much less on an empty or nearly empty spool the wire would break before it could all be drawn off the spool.

I, Fig. 2, is a groove on the spindle D in which the end of a pin J enters to keep this spindle in place. K (shown by dotted lines in Fig. 1) is a spring for throwing this pin in.

Fig. 4 is a modification of my invention, the friction-plate and washer being similar to those already described, but the spring being differently arranged. The spindle D, instead of passing directly through the spool, as in the case described above, passes through a bushing *c*, the upper part of which is made with shoulders, as shown, and the lower outside part of which is threaded. *d* is the bearing upon which the spool turns, its upper inside part bearing against a shoulder near the top of bushing *c*, and its lower inside part bearing upon the outside of a flanged thimble *e*, which is screwed upon the lower part of the bushing *c* and against the friction-plate C, as shown. The spring G surrounds the bushing *c*, one of its ends being secured to this bushing and the other to the friction-plate. The bushing or hub *c* does not revolve, being secured to spindle D or to the shuttle-body A in any suitable manner. As the spool is unwound, the friction causes friction-plate C to be turned, winding up spring G, substantially as before described.

Having thus described my invention, I claim—

1. The combination, with the shuttle-body, of the spool, a friction-plate and washer against which the lower head of the spool bears, a spindle upon which said friction-plate and spool are mounted, and a spring one end of which is attached to said friction-plate and the other to some fixed point on the spindle or shuttle-body.

2. The combination, with the shuttle-body, spool, friction-plate and washer, and spindle, of a hub on the spindle on which the friction-plate revolves, a spring one end of which is attached to the friction-plate and the other to the hub, and a case upon the friction-plate for covering the spring.

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