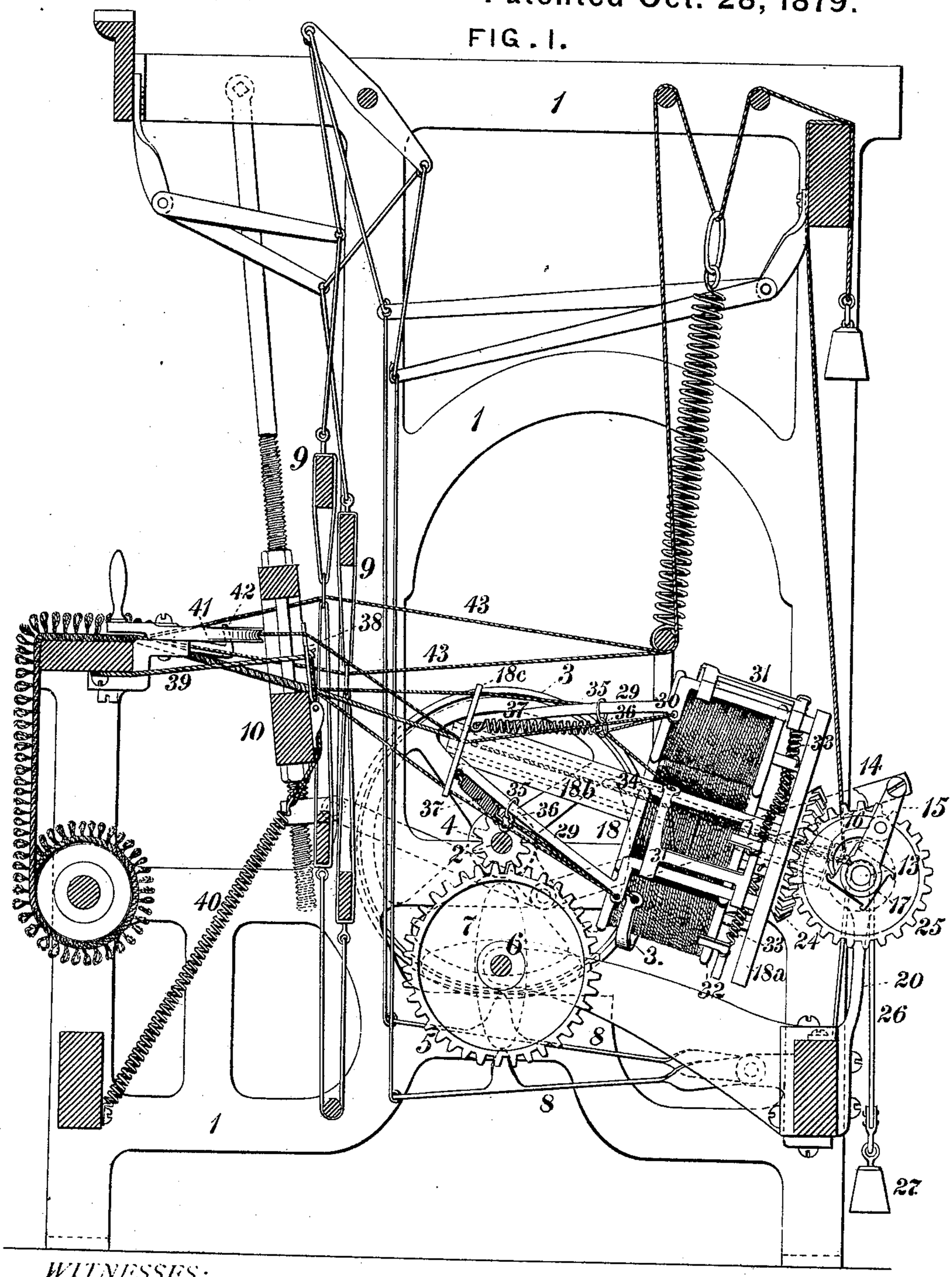
2 Sheets—Sheet 1.

L. J. McDONALD.

Fringe-Loom.

No. 220,931. Patented Oct. 28, 1879.

FIG. 1.



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2 Sheets—Sheet 2.

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No. 220,931. Patented Oct. 28, 1879.

FIG. 2.

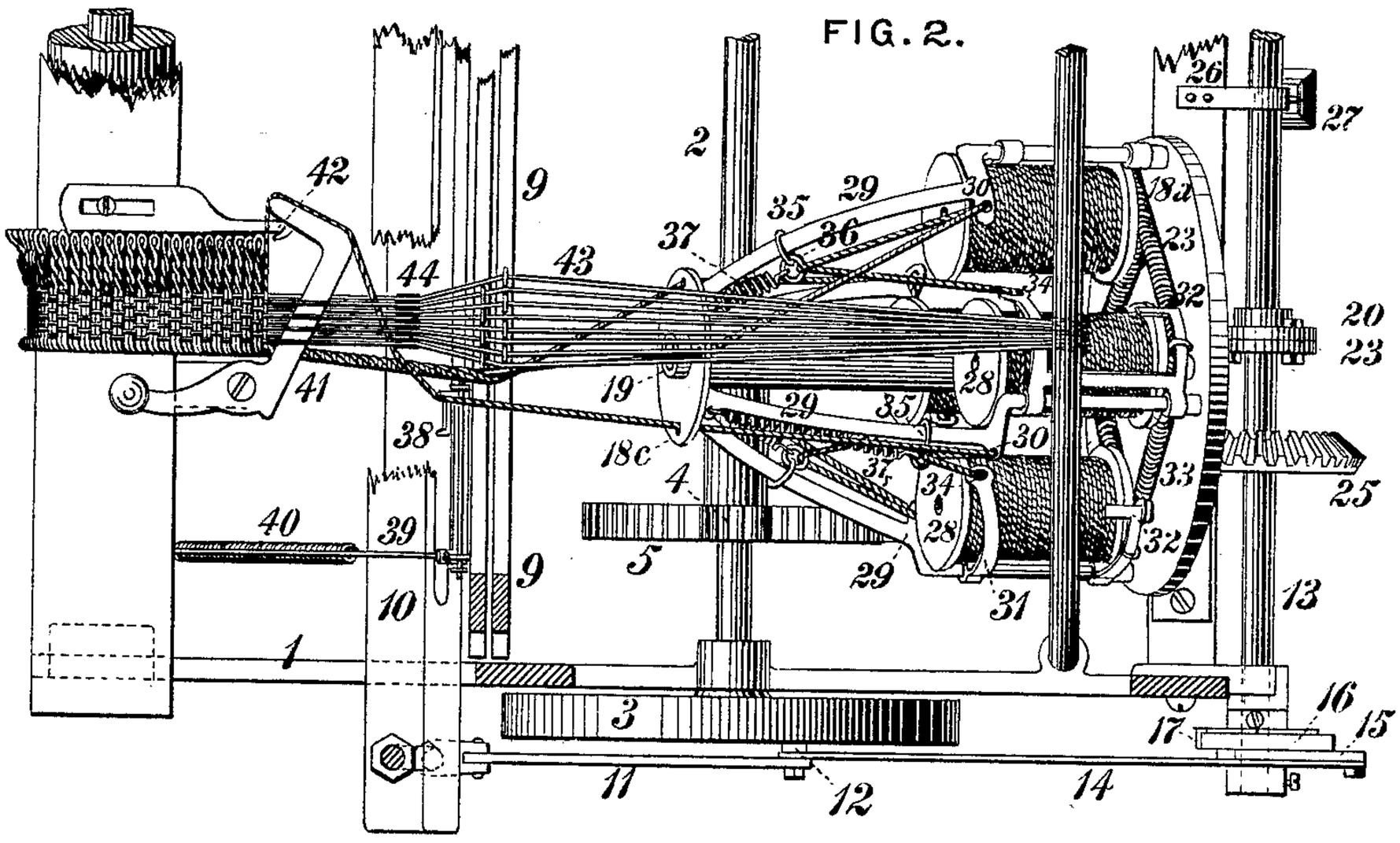


FIG. 5.

FIG. 3.

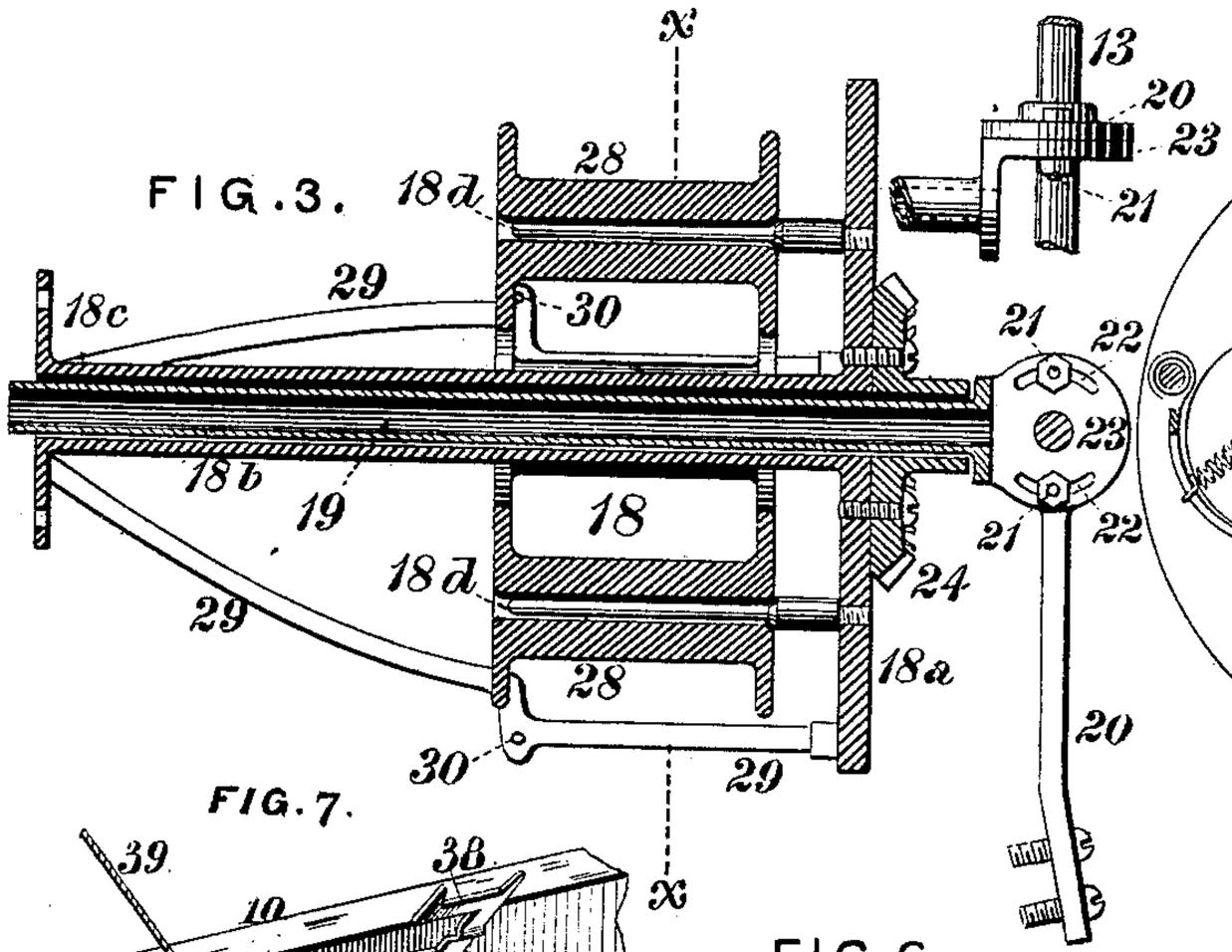


FIG. 4.

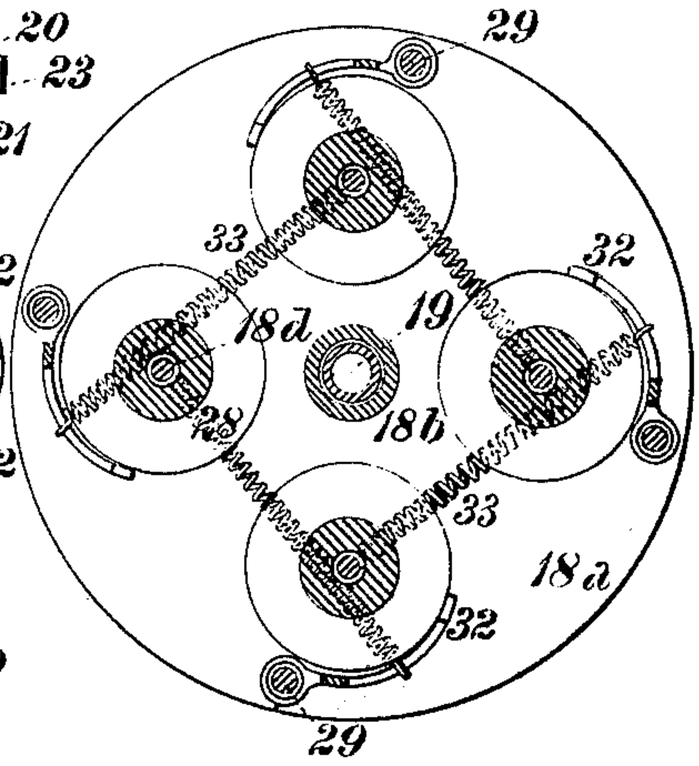


FIG. 7.

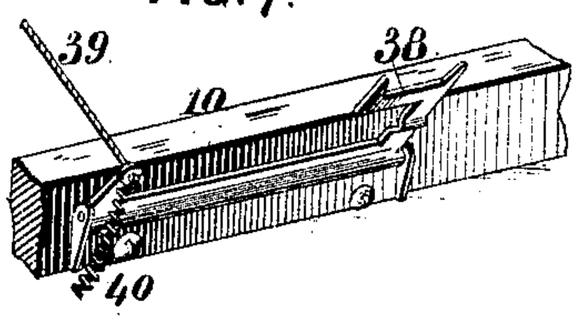
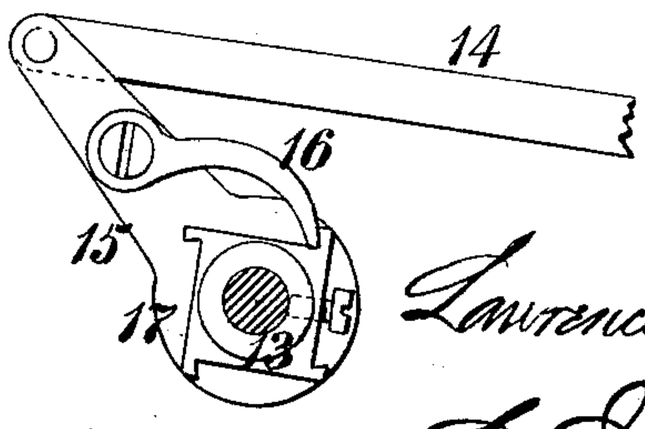


FIG. 6.



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UNITED STATES PATENT OFFICE.

LAURENCE J. McDONALD, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO JOHN C. GRAHAM, OF SAME PLACE.

IMPROVEMENT IN FRINGE-LOOMS.

Specification forming part of Letters Patent No. **220,931**, dated October 28, 1879; application filed January 15, 1879.

To all whom it may concern:

Be it known that I, LAURENCE J. McDONALD, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Fringe-Looms, of which improvements the following is a specification.

The object of my invention is to provide in a loom for weaving and twisting bullion-fringe simple and effective means for supporting and conducting to the doubling or looping mechanism any desired number of filling or bullion threads, and forming upon the fringe what is known as a "cord-heading," the several operations of twisting, doubling, and weaving being automatically and continuously effected during the operation of the loom.

To this end my improvements consist in an intermittently-rotating spool-carrier provided with novel thread-supply and tension-regulating devices, and in the combination of said spool-carrier and its accessories with the heddles and doubling mechanism, all as hereinafter more fully set forth.

In the accompanying drawings, which form part of this specification, Figure 1 is a vertical longitudinal section through a fringe-loom having my improvements applied; Fig. 2, a plan or top view, partly in section, of so much of the loom as is necessary to exhibit said improvements; Fig. 3, a longitudinal central section through the spool-carrier; Fig. 4, a transverse section through the same at the line *x x* of Fig. 3; Fig. 5, a plan or top view of the spool-carrier support; Fig. 6, a side view, in elevation, of the mechanism for rotating the spool-carrier, and Fig. 7, a view, in perspective, of the lifter.

For the purpose of avoiding unnecessary duplication, I have herein described and shown only a single series of my improvements as applied to a loom; but in practice I use any number that may be conveniently applicable in the width of the loom, the operation of forming the fringe being similar in the several series employed.

The frame 1 1 of the loom supports in suitable bearings a driving-shaft, 2, having pulleys 3 on its ends, through one of which the driving-power is imparted from the prime mover. A spur-pinion, 4, on the driving-shaft 2 meshes with a gear, 5, on a lower shaft, 6, carrying cams 7, (shown in dotted lines in Fig. 1,) which actuate treadles 8, operating the heddles 9 in the ordinary manner, and the lay or batten 10 is vibrated by connecting-rods 11, by which it is coupled to crank-pins 12 on the pulleys 3 of the driving-shaft.

A horizontal shaft, 13, is mounted in bearings on the frame 1 at the end thereof farthest from the lay, and is intermittently rotated by a connecting-rod, 14, which is coupled at one end to the crank-pin 12 of one of the pulleys 3 of the driving-shaft 2, and at the other end to a crank, 15, fitting loosely upon the shaft 13, and having a pivoted pawl, 16, which engages the teeth of a ratchet-block, 17, secured upon said shaft 13.

The number of teeth in the ratchet-block 17 corresponds with the number of spools in the spool-carrier, to be presently described, so that at each revolution of the driving-shaft 2 the shaft 13 is rotated by the vibration of the crank for a fraction of a revolution, the denominator of which fraction equals the number of spools on the carrier, the object of this partial rotation being to successively present the threads of the several spools in proper position to be acted on by the lifter and doubler, by which the loops of the fringe are formed, as hereinafter to be more fully described.

A brake, composed of a strap, 26, which is secured to one of the frame-bars, and, passing around the shaft 13, has a weight, 27, upon its lower end, serves to prevent the backward movement of the shaft when the pawl is released from the ratchet-block.

A spool-carrier, 18, (one or more, the number being as great as may be desired and as is admissible in the width of the loom,) is mounted loosely upon a tubular journal, 19, which is secured in an inclined position to a vertical support, 20, bolted to the frame 1 below the shaft 13, the angle of the journal 19 being variable, as may be desired, by means of its connection to its support 20, this connection being effected by bolts 21, which pass through slots 22 in a wing or flange, 23, on the outer end of the tubular journal, and secure the same adjustably to a plate or disk on

the upper end of the support 20, proper openings being formed in the wing and support for the free passage of the shaft 13.

The spool-carrier 18 is composed of a bottom plate or disk, 18*a*, connected by a central tubular stem, 18*b*, to a top plate, 18*c*, and having a series of spool-spindles, 18*d*, arranged at equal intervals around the central stem. A miter-gear, 24, is secured upon the outer face of the bottom plate and meshes with a corresponding gear, 25, on the shaft 13 to impart the intermittent rotary movement of said shaft to the carrier.

The spools or bobbins 28, upon which the bullion-threads are wound, are fitted so as to rotate freely upon the spindles 18*d*, and the threads are guided in their passage from the carrier to the doubler by eyes or openings in the top plate, 18*c*, the central cord or core of the heading passing through and being guided by the tubular journal 19.

Any convenient number of spools may be used, the number of teeth of the driving ratchet-block 17 being made to correspond thereto, so that at each revolution of the driving-shaft of the loom each spool upon the carrier will be rotated a distance equal to the arc extending from the center of one spool-spindle to that of the adjacent one, and in the succeeding interval of rest will stand in the position occupied during the preceding interval by its predecessor.

A series of guides, 29, one for each spool-spindle, project perpendicularly from the bottom plate of the spool-carrier, each being bent so as to form a substantially right-angled elbow, in which an eye, 30, is formed, at a height from the bottom plate about equal to that of the spool-spindles, after which the guides converge and are connected at their upper ends to the top plate of the carrier.

A tension-regulator and spool-brake, 31, is journaled on the perpendicular portion of each of the guides 29, and has a lower arm carrying a brake-shoe, 32, which rests upon the lower flange of the adjacent bobbin 28, and is pressed against the same by a brake-spring, 33, connected at one end to the brake-arm and at the other to any suitable point of attachment on the lower plate, 18*a*, of the carrier.

The amount of tension of the brake upon the bobbin may be varied by attaching the spring to the brake-arm at a greater or less distance from the guide, as may be required.

The upper arm, which constitutes the tension-regulating portion of the device, has an eye, 34, through which the thread from the adjacent bobbin is led.

A ring or traveler, 35, is fitted to slide upon the curved portion of each of the guides 29 above the elbow, and is linked to an eye, 36, which is, in turn, linked to one end of what I term a "shot-regulating tension-spring," 37, the other end of which spring is secured to the top plate, 18*c*, of the spool-carrier.

A lifter, 38, by which each of the bullion or filling threads of the several spools is in turn elevated into proper position to be caught and passed through the warp-threads by the vibrating doubler 41, which forms the loops of the fringe, is journaled upon the lay 10, and is raised by the latter as it vibrates in the direction of the spool-carrier, being attached by a cord, 39, to the frame of the loom outside of the lay.

The cord 39 is maintained taut by a spring, 40, which draws down the lifter on the outward movement of the lay.

The doubler 41 is a double-armed lever mounted upon a pivot on the frame of the loom, one of its arms having an elbow formed upon it to catch and draw on the several filling-threads as they are successively elevated by the lifter 38, and the other arm serving to enable the doubler to be vibrated at intervals in proper relation to the movements of the lifter, so as to form the loops of the fringe.

The elbow end of the doubler traverses over a receiving-hook, 42, which is secured upon the loom-frame and serves to retain the loops when formed and prevent them from being drawn out by the doubler in its backward traverse.

The mode of operation of the doubler 41, not constituting, *per se*, part of my present invention, need not be here specifically set forth.

The warp threads 43 are wound upon a suitable beam or roller in the upper part of the loom and led through the eyes of the heddles 9 and the reed 44 in the usual way.

In the operation of my improvements the bobbins 28 of the bullion or filling threads are placed upon the spindles 18*d* of the spool-carrier 18, and the core or central cord of the heading is passed through the tubular journal 19. The thread is led from each bobbin first through the eye 34 of the tension-regulator 31, which is journaled on the guide 29 nearest to the bobbin, thence upward and through the eye 36, which is connected to the traveler 35 on the guide 29 immediately in advance of the bobbin, (in the direction of rotation of the carrier,) thence downward and through the eye 30 at the elbow of said last-named guide, thence upward through the eye in the top plate 18*c* of the spool-carrier, which is in line centrally with the bobbin from which the thread extends, and thence to the lifter and doubler. The threads are twisted by the rotation of the spool-carrier, and in its intervals of rest are successively placed in such position as to be raised by the lifter 38 and caught and looped by the doubler 41; and as the heddles 9 and lay 10 are driven by a positive motion from the driving-shaft 2, that imparts movement to the shaft 13, which rotates the spool-carrier 18, these members coincidently operate in proper relation to the intervals of rest of the spool-carrier. The shot-regulating tension-springs 37 act in reverse direction to the draft of the doubler 41 upon the filling-threads, and serve to maintain equal tension upon the threads at every shot. Without this provision the thread would be wound off at times too rapidly, leaving slack on the

bobbin for the next shot, which would produce irregularities in the work. As the spring 37 is drawn out by the draft of the doubler the traveler 35 and its connected eye 36 slide downward on the guide 29, and the thread, acting in the eye 30 at the elbow of the guide as a fulcrum, raises the tension-regulator and spool-brake 31, permitting the necessary amount for the shot to be unwound from the bobbin. On the release of the thread from the doubler, after the formation of the loop, the spring 37 retracts, and the brake-spring 33 brings the tension-regulator and spool-brake to its former position, maintaining the proper degree of tension of the thread for the next shot. By increasing or decreasing the tension of the brake-spring, which may be done by moving it outward from or inwardly toward the guide upon the brake-arm, greater or less tension will be required to lift the brake and unwind the thread, and the size and tightness of the cord-heading may be varied as required without affecting the loop or bullion portion of the fringe.

I claim as my invention and desire to secure by Letters Patent—

1. The combination of a spool-carrier, mechanism for giving intermittent rotation thereto, a lifter carried by the lay and mechanism for operating said lifter, and a doubler, substantially as set forth.

2. The combination of a spool-carrier, bevel-gearing connecting said carrier with a driving-shaft having a ratchet-block secured upon it, a crank mounted loosely on said driving-shaft and carrying a pivoted pawl engaging the teeth of the ratchet-block, and a connecting-rod by which said crank is vibrated from a continuously-rotating shaft, substantially as and for the purpose set forth.

3. The combinatisn of a spool-carrier, mechanism, as described, for giving intermittent rotation thereto, a tubular journal on which the spool-carrier rotates, said journal having a slotted flange or wing upon one of its ends, and a vertical support to which the wing of the journal is adjustably connected, substantially as set forth.

4. The combination of a spool-spindle, a spool or bobbin, and a pivoted double-armed tension-regulator and spool-brake, as described, having a lower arm, which bears upon the bobbin, and an upper arm carrying an eye for the passage of the thread, substantially as set forth.

5. The combination, with a spool-carrier, substantially as described, of a series of guides connecting its upper and lower plates, said guides having eyes formed in them at or about the level of the ends of the spool-spindles, as and for the purpose set forth.

6. The combination, with the spool-carrier, of the shot-regulating tension-springs, the guides and their travelers, the eyes connected to said travelers, the tension-regulators and spool-brakes, and the brake-springs, substantially as set forth.

7. The combination of the lay or batten, the lifter journaled thereon, the loom-frame, and the spring and cord connecting said lifter with the loom-frame, substantially as set forth.

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