Sheet 1. 3 Sheets.

B. C. Coldwell,

Spinning Machine.

No. 88,450. Patented Mar. 30. 1869.

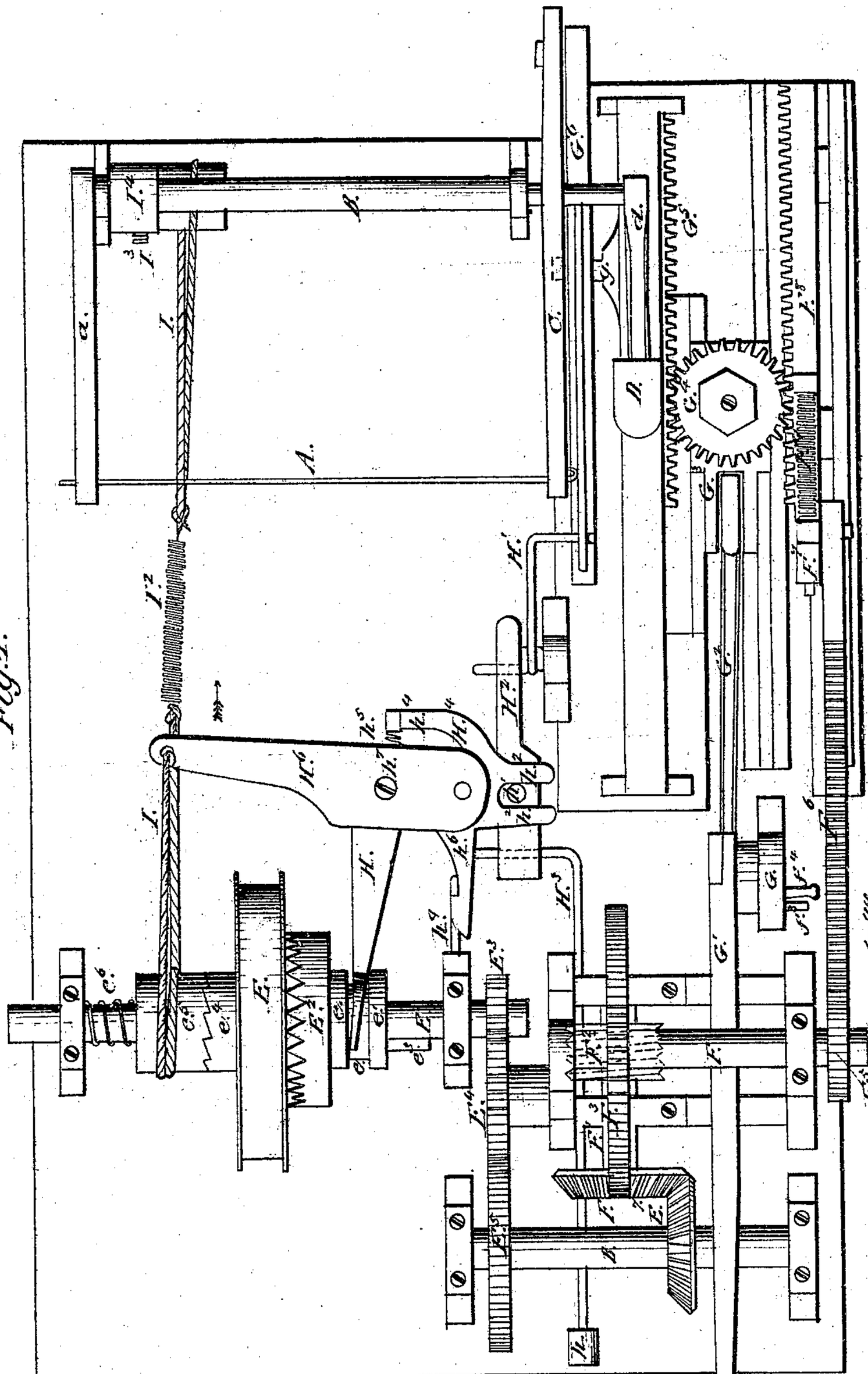

Fig. 1.

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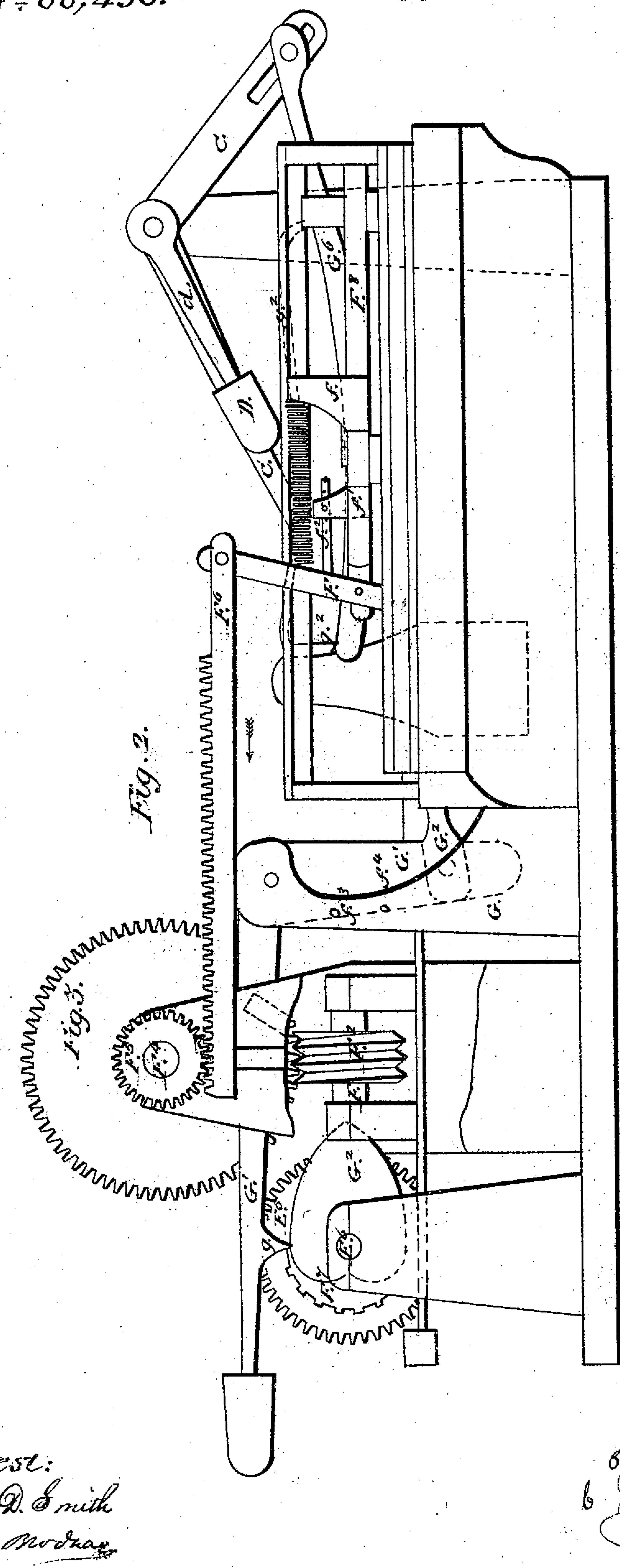

Fig. 2.

Fig. 3.

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Sheet 3. 3 Sheets.

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Spinning Machine.

No. 88,450. Patented Mar. 30. 1869.

Fig. 4.

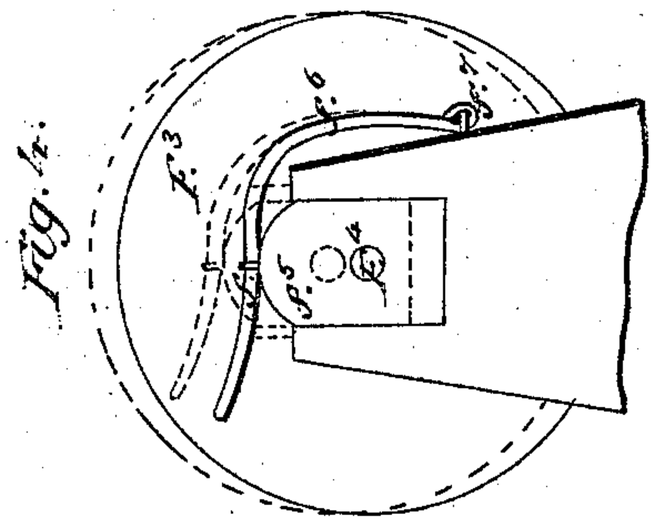
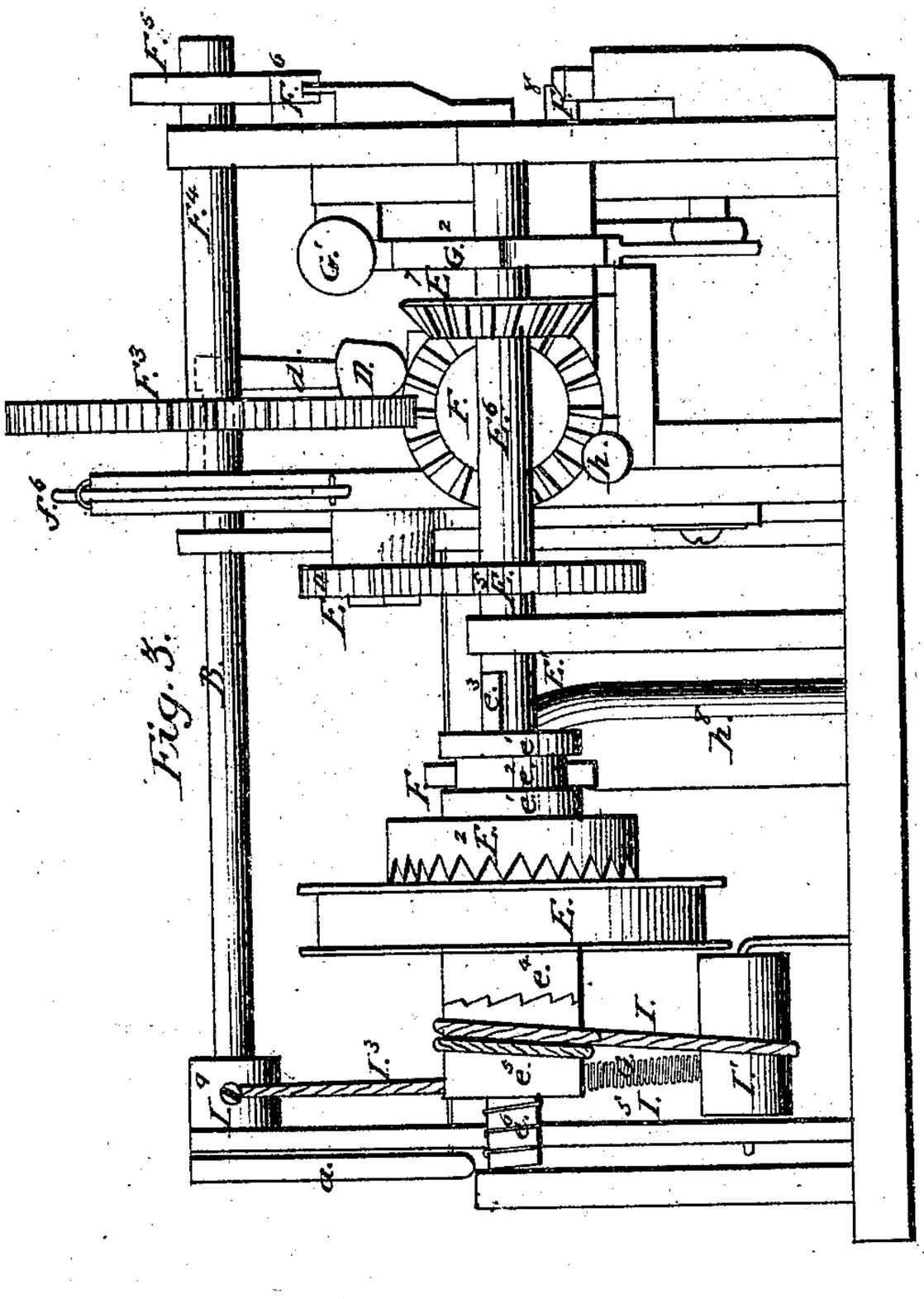


Fig. 5.



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Letters Patent No. 88,450, *dated March* 30, 1869.

IMPROVEMENT IN SPINNING-MULE.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, B. C. COLDWELL, of Wyoming, in the county of Luzerne, and State of Pennsylvania, have invented a new and useful Improvement in Spinning-Machines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a top view;

Figure 2, a side elevation;

Figure 3, a back view of my machine; and

Figure 4, a detailed view.

The nature of my invention consists in novel mechanism for operating the faller, whereby the spinning-mechanism is adapted to wind up the threads of the bobbins in a more perfect and regular manner than could be done heretofore, the object being to produce an elegantly-shaped bobbin, with the threads uniformly wound.

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

In fig. 1, A represents the so-called faller, the same consisting of a wire running nearly across the whole width of the spinning-machine, and being attached to the ends of a number of levers, one of which is seen at *a*, which are fastened to a rod, B, parallel with A.

The rod B is operated by an angular lever, C, and a weight, D, on an arm, *d*.

The motion of lever C is received from a main pulley, E, through the medium of parts hereinafter described.

This pulley E receives its motion from a belt from the cylinder of the spinning-machine, in a well-known manner, and it is supported by but not fastened to a shaft, E^1, and has one or more V-shaped clutch-teeth, *e*, on one side, and a clutch-hub, e^1, on the other side.

A clutch-head, E^2, which, by means of a hub, e^1, and groove, e^2, forked lever H, and a key, e^3, can be moved away from or toward the pulley E, will, in the latter case, participate in the motion of the pulley, and transfer it to the shaft E^1, and from there, by means of an exchangeable pinion, E^3, to an adjustable intermediate wheel, E^4, which imparts its motion to another toothed wheel, E^5, on a shaft, E^6.

From this shaft, the motion is transferred by means of a bevelled gear, E^7, gearing into another bevel-gear, F, on a shaft, F^1, to which a screw, or worm, F^2, is fastened.

A worm-wheel, F^3, is rotated by said worm F^2, and, being fastened to a shaft, F^4, with a pinion, F^5, at its end, which gears into a rack, F^6, it imparts a very slow motion to the rack, so that the said rack will only travel its own length, or part of it, in the time necessary to finish a complete set of bobbins on the spinning-machine.

This rack is connected to another rack, F^8, by means of a lever, or connecting-rod, F^7, and a spring, F^9.

The two racks mentioned are parallel, or nearly so, and the connecting-rod F^7 is pivoted to one end of each of them, as seen plainly in fig. 2.

The spring F^9 is fastened to the upper end of an upright projection, *f*, on rack F^8, and to the lever F^7.

Another upright projection, f^1, supports a set-screw, or pin, f^2, in such manner that the head of said set-screw will prevent the spring F^9 from drawing the lever F^7 further onward than the operator may desire.

There are also two pins, f^3 and f^4, fastened to an upright bearing, G, which supports a lever, G^1, having a bearing-tooth, *g*, and a weight on its end.

The pins regulate the movement of the lever F^7; and the tooth *g*, on lever G^1, bears on a heart-shaped cam, G^2, in fig. 2.

The shorter end of the angular lever G^1 has a connecting-rod, G^2, pivoted to it, which moves a cross-head, G^3, between two horizontal slides.

A pinion, G^4, is so pivoted to said cross-head that it gears into the rack F^8, and into another rack, G^5, both of these racks being parallel to the guides of the cross-head above mentioned.

The rack G^5, which is enabled, by two small cross-heads and horizontal guides, to move in a horizontal line, parallel with cross-head G^3, has a tooth, g^1, fastened to it, which fits into a notch on the lower part of a rod, G^6, pivoted to lever C, by which means rack G^5 and rod G^6 may be coupled or disengaged.

The rod G^6 is provided with a peculiarly-shaped wire, or rod, g^2, which serves as a guide for G^6, when travelling, and enables a lever, H^1, to lift it when necessary.

Lever H^1 is of angular shape, and receives motion through a connecting-plate, H^3, and a rod, H^2, having a bumper, *h*, at its forward end.

H^2 transfers its motion, also, by an upright pin, h^1, to a compound lever, H^4 H^6 H, having a forked end, h^2, on lever H^4, which is pivoted to lever H^6 by a pin, h^3, and has a tension-spring, h^5, at the end of arm h^4, to operate a latch-hook, h^6.

H^6 swings around a pin, h^7, on an upright stand, h^8, and the forked lever H is fastened to it, so that it can be operated by the rod H^3.

The latch-hook h^6 catches against a rod, h^9, on the stand which supports shaft E^1.

The left-hand end of lever H^6 is operated by a cord, I, figs. 1 and 3, by means of friction on the clutch e^5, around which said cord is coiled, and from whence it passes down to and around an intermediate pulley, I^1, and up again to lever H^6.

To keep up a certain tension, a spring, I^2, is attached to the cord I, at any convenient place.

Another cord, I^3, fig. 3, is fastened to I, and passes up to a pulley, I^4, on shaft B, to which it is fastened.

This cord I^3 is also provided with a tension-spring, I^5.

A small spring, e^6, on shaft E^1, serves to push clutch e^5 against its mate, e^4.

Fig. 4 illustrates the method of disconnecting the worm-wheel F^3 from the worm, or screw F^2. This is

done by moving a lever, f^6, pivoted at f^7, and passing through a metallic eye, f^8, on the bearing f^5, which supports shaft F^4. The result will be understood by reference to the figure in red lines.

Having thus described the construction of my mechanism, I will now explain its operation:

Supposing that a full set of bobbins has been completed, and removed, and the machine is ready to begin spinning again, the weight D, on the faller A, and also the faller, are down, and the rod G^6 disconnected from the rack G^5; now, the operator, by lifting the lever f^6, disconnects the wheel F^3 from the worm F^2, and so rotates the wheel as to move the rack F^6 to its full extent in the direction of the arrow. (See fig. 1.) This moves the pinion G^4, and the rack G^5 is thereby moved back, until the tooth g^1 catches into the notch in the rod G^6, and couples the rack and rod together.

This backward movement of the rack F^6 brings the end of rack F^8 against the pin f^3, which causes the spring F^9 to stretch, so that the lever F^7 will leave the pin f^4.

Now the connection between F^3 and F^2 is restored again, and the spinning-machine started anew.

The latch-hook h^6, being freed by the preceding action of the machinery, the large clutch E^2 is off the clutch-tooth or teeth e, and consequently out of gear with it or them.

The small clutches e^4 and e^5 do not catch, because the motion is such that they slide against each other.

The whole faller-arrangement, therefore, remains at rest as long as the spinning-process lasts.

As soon as the frame is run out the required length, the spinning-machine is reversed, for backing off, or unwinding the yarns from the tops of the spindles. This back motion will cause clutch e^4 to catch clutch e^5, and thus pull the cord I by friction, so that it will move the lever H^6 in the direction indicated by an arrow. The consequence is, that latch-hook h^6 catches on the rod h^9, and the forked lever H brings the clutch-head E^2 in contact with tooth e, which insures the coupling of the faller-machinery with the driving-pulley E. After this, the machine is reversed again, and the winding-up begins.

The rack F^6 is moved in the direction contrary to the red arrow, as seen in figs. 1 and 2, so slowly that only a very small part of way is travelled with each action of the faller.

The cam G^2 moves the lever G^1 up, and thereby the connecting-rod G^2, cross-head G^3, and pinion G^4, forward.

The rack F^8 receives no motion from the rack F^6, until F^6 has so far moved that the lever F^7, with its lower part, comes in contact with pin f^4, when it receives a fractional part of the said motion, as long as lever F^7 swings around pin f^4.

From the time when lever F^7 comes in contact with the adjustable set-screw, or pin f^2, the racks F^6 F^8 move at the same rate of speed.

In this manner, the shape of the bobbin is determined, for it is evident that the motion of the rack F^3 is the general feed-motion for all the successive layers of yarn which form the bobbins.

If the rack F^8 were stationary, one certain tooth on the pinion G^4 would, at the beginning of each stroke of the cross-head G^3, always be in the same relative position with its surrounding machinery; but, with the motion of F^8 referred to, the same tooth, with each stroke, is found to be a little ahead of the position it occupied during the former stroke. Thus the rack G^5, which is moved by the pinion G^4, begins each successive stroke at a point in advance of the former one, and, according to this, are the up-and-down movements of the faller gradually higher, until the bobbin is finished.

The reason for beginning the operation by keeping the rack F^8 stationary, and afterward allowing it to assume the speed of F^6 by degrees, is this, that, by the said operation, a shoulder, or foundation for the bobbin is effected, which supports all the other layers, and the bobbin receives its proper shape, *i. e.*, pointed at the top.

Each revolution of the cam G^2 supplies the bobbin with one layer of yarn, and a new length of twisted material.

During the twisting-operation, the faller is raised above the tops of the spindle, and remains inactive. The yarn will be found to be wound up partly on the spindle, caused by its own weight, and a slight friction on the spindle, and the inclination for forming loops, or knots. This has to be removed, or unwound; therefore the machine is reversed.

This motion, besides unwinding the yarn, has the effect of coupling the clutch-head E^2 with the main pulley E, in the manner already described. The faller-rod A is, by the same motion, drawn downward, and the rod G^6 is thereby moved back until it catches on the tooth g^1, and couples the rack G^5 with the faller. After this, the machine is reversed again to its former motion, and the faller-arrangement, being effected in the same manner, begins the winding-up operation, by moving up and down, and guiding the yarn to the spindle with an irregular motion, or speed, the effect of which is to produce a pear-shaped bobbin.

The shape of this bobbin can easily be altered, or regulated, by changing the circumferential shape of the cam G^2, or by setting the set-screw f^2 either forward or backward, or by changing the length of lever F^7, or by changing the position of pins f^3 f^4.

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

1. The mechanism for operating the faller, constructed substantially in the manner and for the purpose herein described and represented.

2. The combination, with the faller of the racks F^6 F^8, pinion G^4, and rack G^5, all arranged and applied as herein described, and operating in the manner and for the purpose specified.

3. The combination of the cam G^2, elbow-lever G^1, rod G^2, cross-head G^3, and pinion G^4, all arranged and operating substantially as and for the purpose herein set forth.

4. The combination of the racks F^6 F^8, lever F^7, spring F^9, set-screw f^2, and pins f^3 f^4, arranged and operating substantially as described.

B. C. COLDWELL.

Witnesses:

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