

(No Model.)

2 Sheets—Sheet 1.

R. STEEL & J. VANNOTE.

SPRING MOTOR.

No. 309,893.

Patented Dec. 30, 1884.

FIG.1

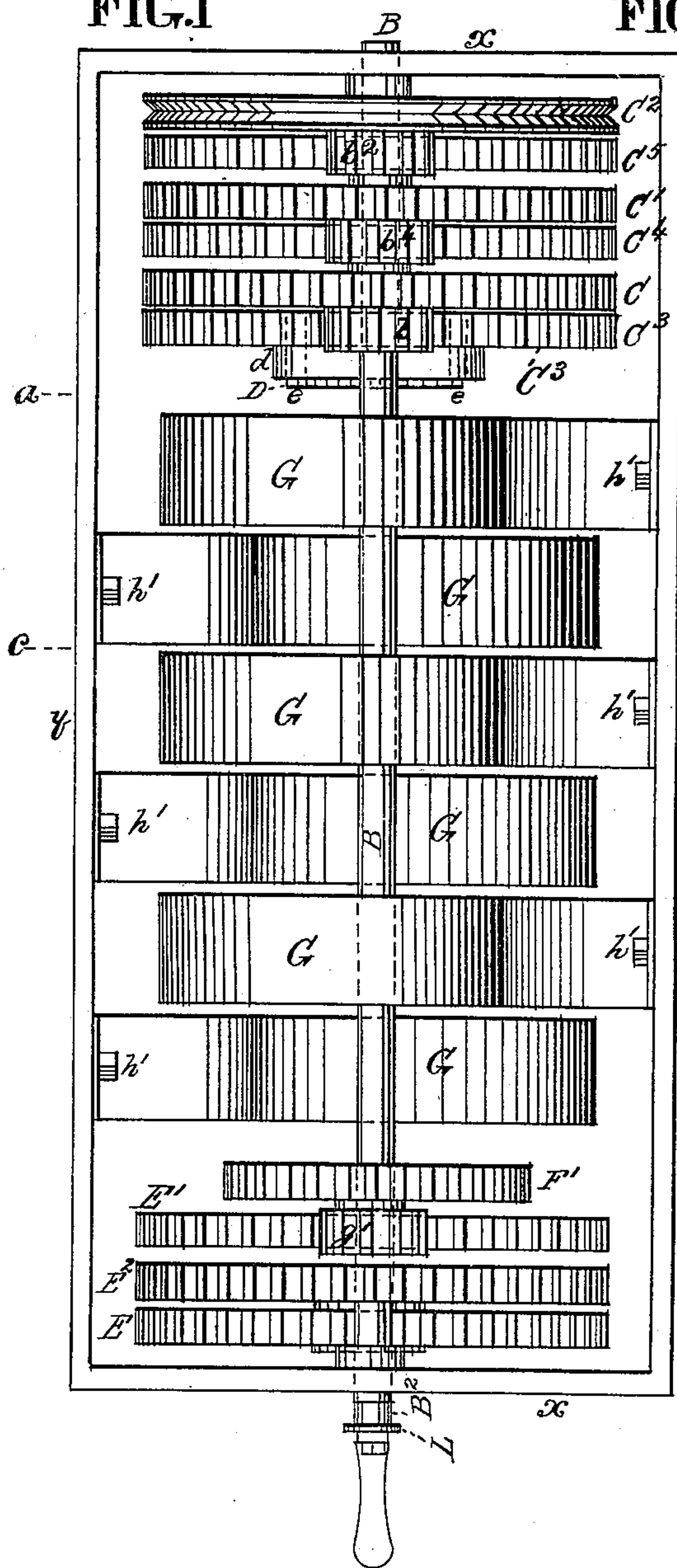


FIG. 2

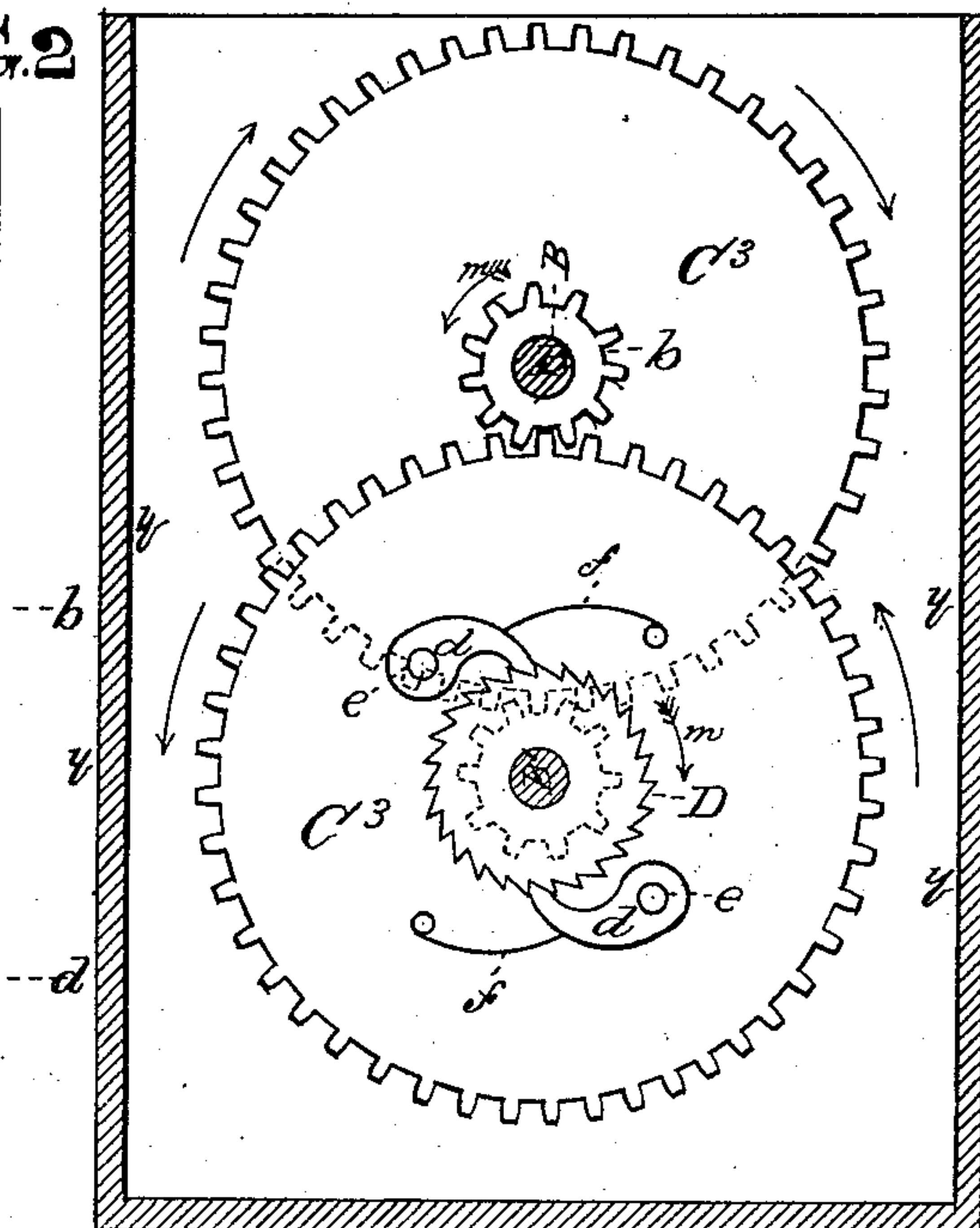
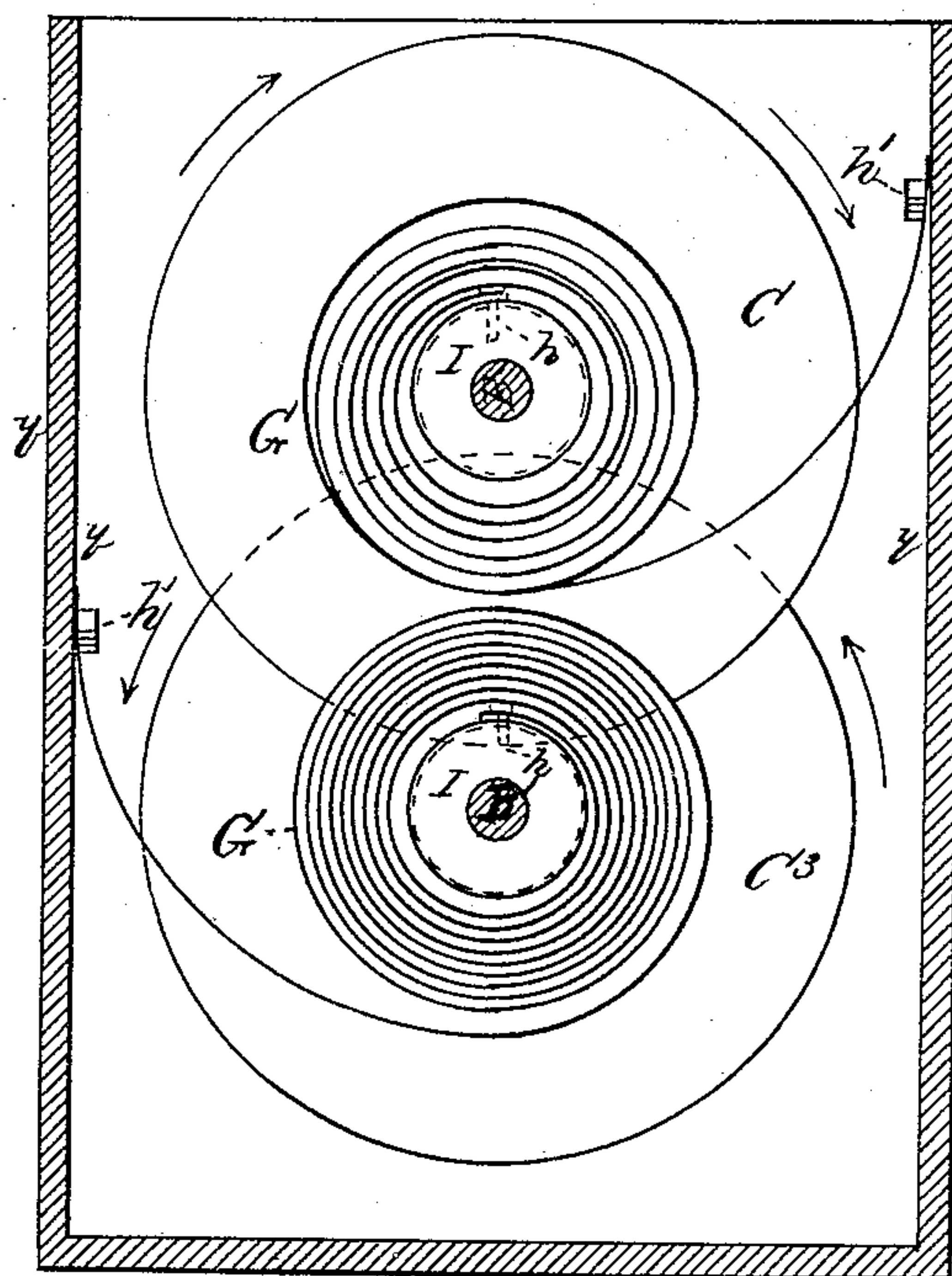


FIG.3



Witnesses.

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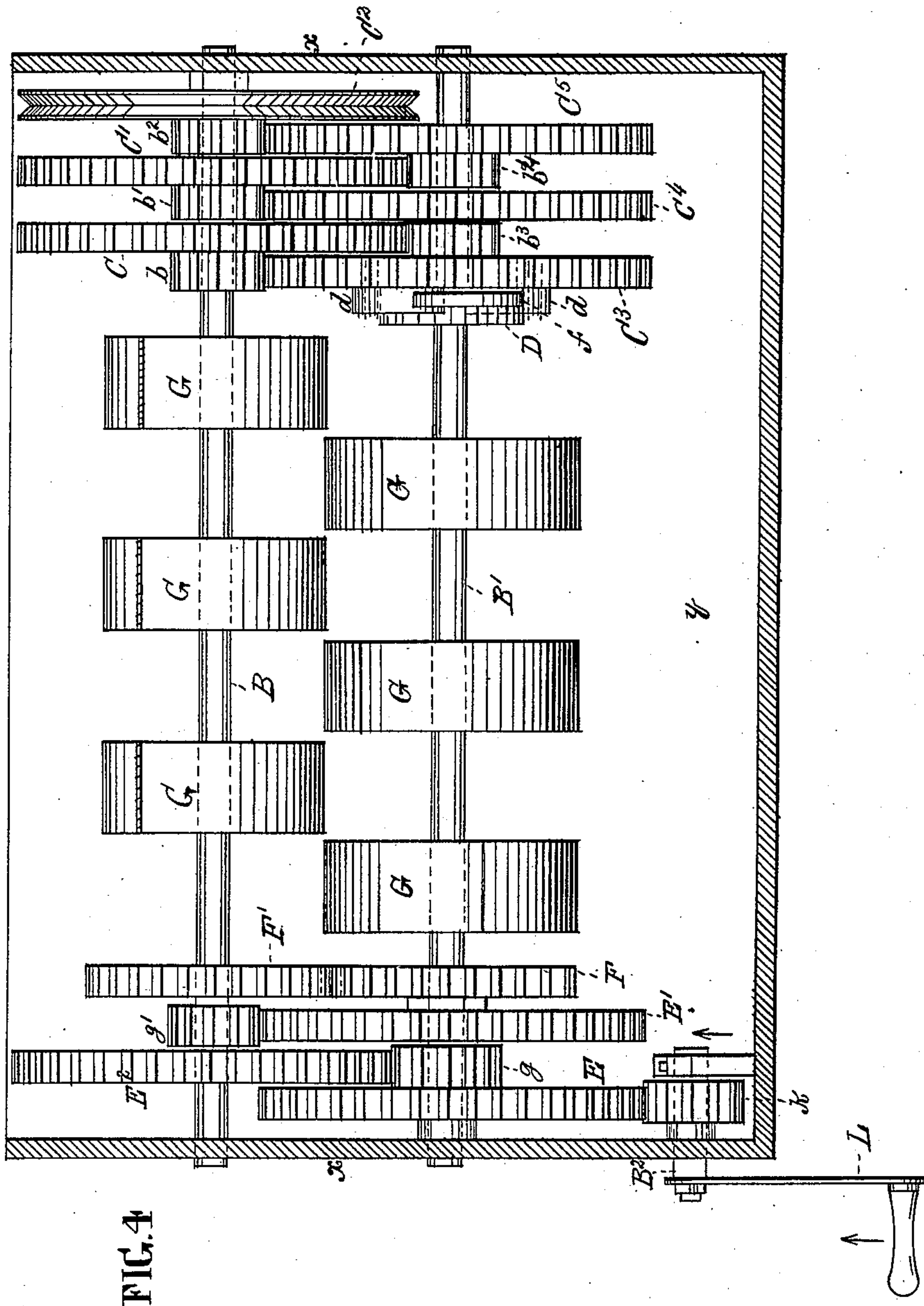
(No Model.)

2 Sheets—Sheet 2.

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SPRING MOTOR.

No. 309,893.

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Witnesses.

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UNITED STATES PATENT OFFICE.

ROBERT STEEL AND JONATHAN VANNOTE, OF PHILADELPHIA, PA.

SPRING-MOTOR.

SPECIFICATION forming part of Letters Patent No. 309,893, dated December 30, 1884.

Application filed November 10, 1884. (No model.)

To all whom it may concern:

Be it known that we, ROBERT STEEL and JONATHAN VANNOTE, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Spring-Motors, of which the following is a specification.

Our invention consists of the combination of a train of gear-wheels and pinions upon two shafts arranged in the same vertical plane, that are actuated by the force imparted thereto by the resiliency of a series of coiled springs, (the inner end of each spring being permanently connected to its arbor fast on the shaft to which it is attached, the resilient end being fast to the case,) which are wound down closely to obtain tensional force by a second series of fast and loose gear-wheels and pinions gearing together upon the opposite ends of the shafts to which the driving-train is attached, a third short shaft and its pinion and crank serving to give rotary motion to the above-mentioned train of winding-gearing. The mechanism for winding the coiled springs and the train of wheels through which motion is imparted are contained within a case attached to the under side of a table of a sewing-machine, or to any convenient point of the machinery which it is desired to rotate.

The object of this invention is to provide a simple compact motor adapted to be used for the propulsion of sewing-machines and other light machinery.

In the accompanying drawings, which make a part of this specification, Figure 1 is a plan view of our improved apparatus. Fig. 2 is a cross-section taken at the line *a b* of Fig. 1. Fig. 3 is a like view taken at the line *c d* of Fig. 1. Fig. 4 is a side elevation with the front of the case A removed.

Like letters of reference in all the figures indicate the same parts.

A is the metallic case, containing the apparatus, in the ends *x x* of which the driving-shafts B B' have their bearings. B is the upper shaft; B', the lower. The shaft B is provided with the toothed wheels C C' C² and their respective pinions *b b' b²*, into which the like wheels C³ C⁴ C⁵ gear by the pinions *b³ b⁴*. The gear-wheels and their respective pinions are loose, and revolve upon the shafts to which

they are attached. The only wheel which is fast on the shaft (connected to the train of driving-gear) is the ratchet-wheel D, whose pawls *d d* are attached to the gear-wheel C³ on the shaft B' by means of the pins *e e*. The springs *f f* retain the pawls *d* in connection with the wheel C³. (Seen clearly in Fig. 2.) On the opposite ends of the shafts B B', to which the train of operating-gearing is connected, is the train of winding gear-wheels—first, the toothed wheel E and pinion *g*, attached thereto, and the wheel E', all revolving freely on the shaft B'. On the shaft B is the gear-wheel E² and its pinion *g'*. Into said wheel the pinion *g* on the shaft B' gears, which in turn imparts motion to the wheel F', which is fast on the shaft. From said wheel F' motion is imparted to the wheel F, fast on the shaft B', by means of which motion is imparted to said shaft.

G are the coiled springs, an equal number of which are fastened at their inner ends to the arbors I on the shafts B B' by means of bolts *h*, the outer ends of said springs being secured to the sides *y y* of the case A by means of bolts *h'*. Gearing into the wheel E is the pinion K on the short shaft B², to which is attached the crank L.

The operation is as follows: Power is communicated to the apparatus by turning the crank L in the direction of the arrow, which revolves the pinion K, fast on the shaft B², which in turn revolves the loose wheel E and its connected pinion *g*. This pinion gears into the wheel E² on the shaft B, which has the pinion *g'* attached thereto, also loose and revolving on the shaft. The pinion *g'* gears into the wheel E', which is fast on the shaft B'. Thus motion is imparted to the wheel F', fast on said shaft B', and from thence communicated to the wheel F', (into which it gears,) fast on the shaft B. The motion imparted to the shafts B B' through the above-mentioned train of gear-wheels and intermediates causes said shafts to revolve in the direction of the arrows *m m*, (seen in Fig. 2,) the connection of the ratchet-wheel D and its pawls with the wheel C³ allowing the shaft B to revolve freely upon its axis without moving the train of operating-gearing. The inner ends of the springs G being secured to the arbors I, fast on the shafts B B, by means of the bolts *h*, the outer ends

are secured to the sides *y y* of the case A by the bolts *h'*. The expansive power of the series of coiled springs imparted thereto by the train of winding-gear, which coils the springs
 5 down tightly upon their arbors, then causes the said shafts B B' to commence revolving in the opposite direction to which they were rotated during the winding operation, and carries the wheel C³, held fast on the shaft B' by
 10 its pawl-connection with the ratchet-wheel D, with said shaft B', and imparts motion to the pinion *b* and wheel C, connected together, but loose on the shaft B. The wheel C in turn engages with the pinion *b*³ on shaft B', which is
 15 connected with wheel C⁴, that gears into pinion *b'*, which is fast to wheel C'. This wheel in turn gears into pinion *b*⁴, connected to wheel C⁵, which engages with pinion *b*², and revolves the grooved wheel C², connected with last-mentioned pinion. An endless belt, to communicate with machinery to which rotary motion
 20 is desired to be applied, runs in the groove of wheel C². This wheel C² may be a toothed wheel, and gear with another of equal size or
 25 into a pinion, to impart motion, if desired. By this arrangement of gear-wheels and intermediate pinions upon two shafts, in connection with the expansive or resilient force of the coiled springs, a rapid motion is imparted
 30 to the grooved wheel C², and from thence to machinery desired to be rotated.

Having thus described our improvement in spring-motors, what we desire to secure and claim by Letters Patent is—

1. The series of coiled springs G, having 35 their inner ends secured to the arbors I on the shafts B B' and their outer ends to the case A, in combination with the train of gear-wheels C to C⁵ and pinions *b* to *b*⁴ on said shafts B B', the wheels and pinions so arranged and 40 engaging with each other as to impart rapid rotary motion and power to the grooved wheel C² by means of the resilient force of the springs G, substantially in the manner and for the purpose specified. 45

2. The combination of the pinion K on the shaft B², the train of gear-wheels E E' E² F F', and pinions *g g'* on the shafts B B', and ratchet-wheel D, for coiling the springs G on the arbors I of said shafts, substantially as described. 50

3. The combination, with the case A, of the series of springs G, and trains of operating and winding gearing upon two shafts that have their bearings in the ends of said case, to form 55 a motor for operating machinery, substantially as herein set forth.

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Witnesses:

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