

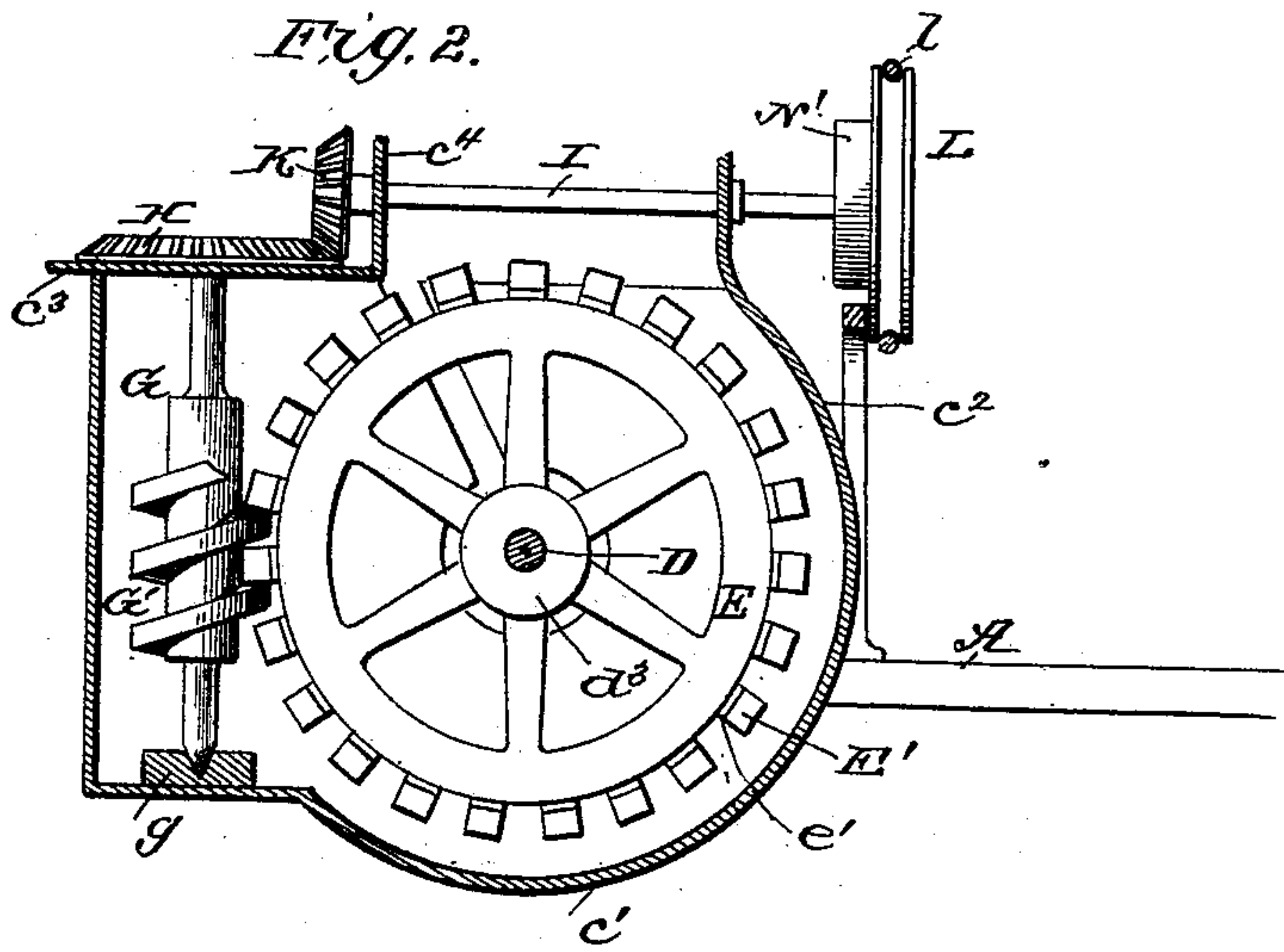
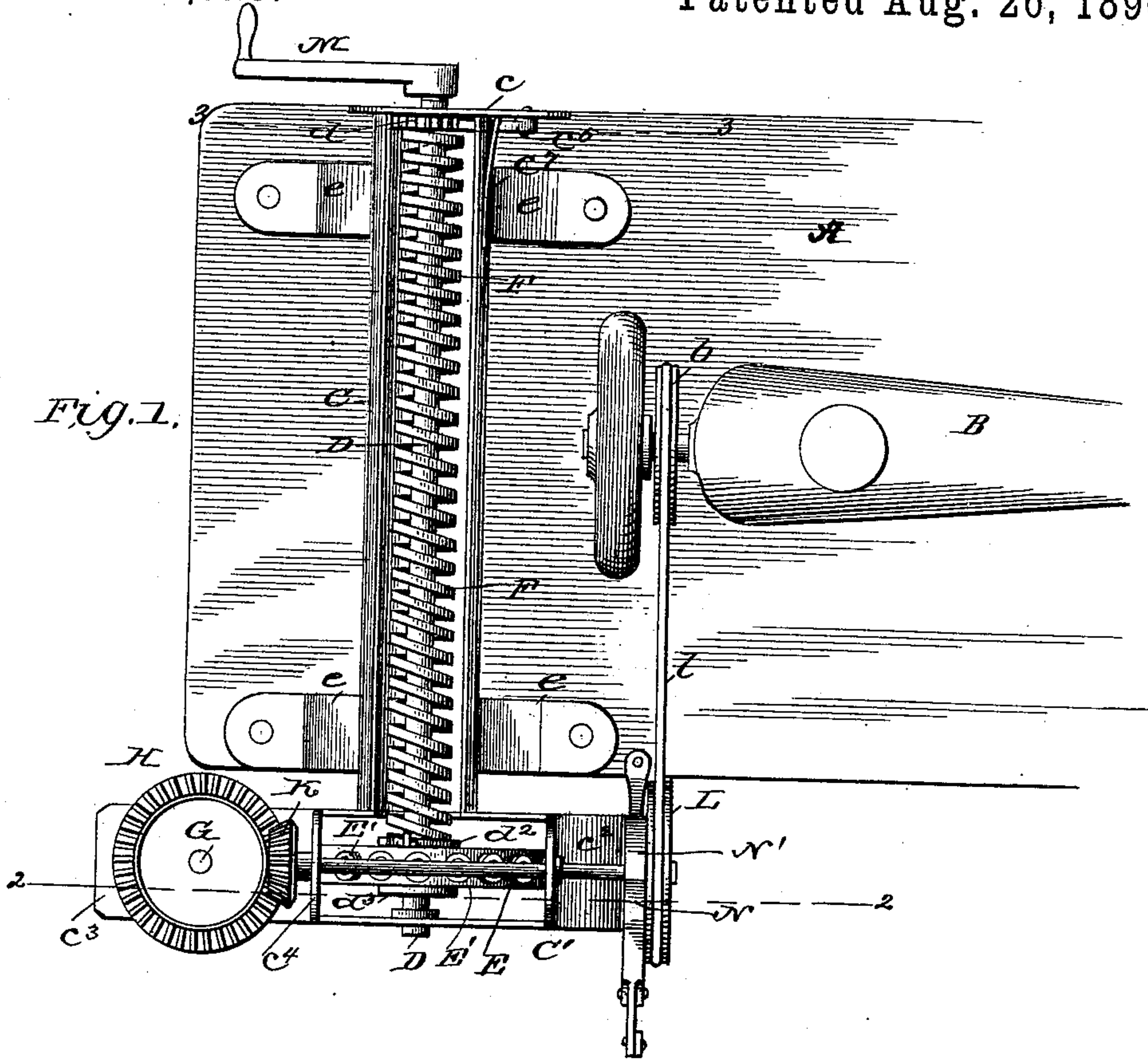
(No Model.)

2 Sheets—Sheet 1.

G. R. SMITH, B. F. COLLINS & J. W. SHOOK.
SEWING MACHINE MOTOR.

No. 435,328.

Patented Aug. 26, 1890.



WITNESSES: -

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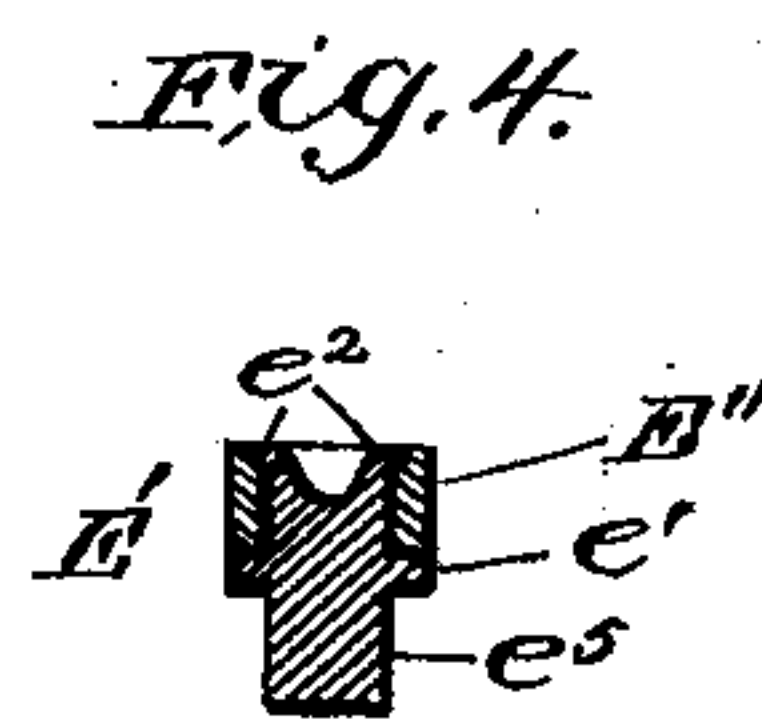
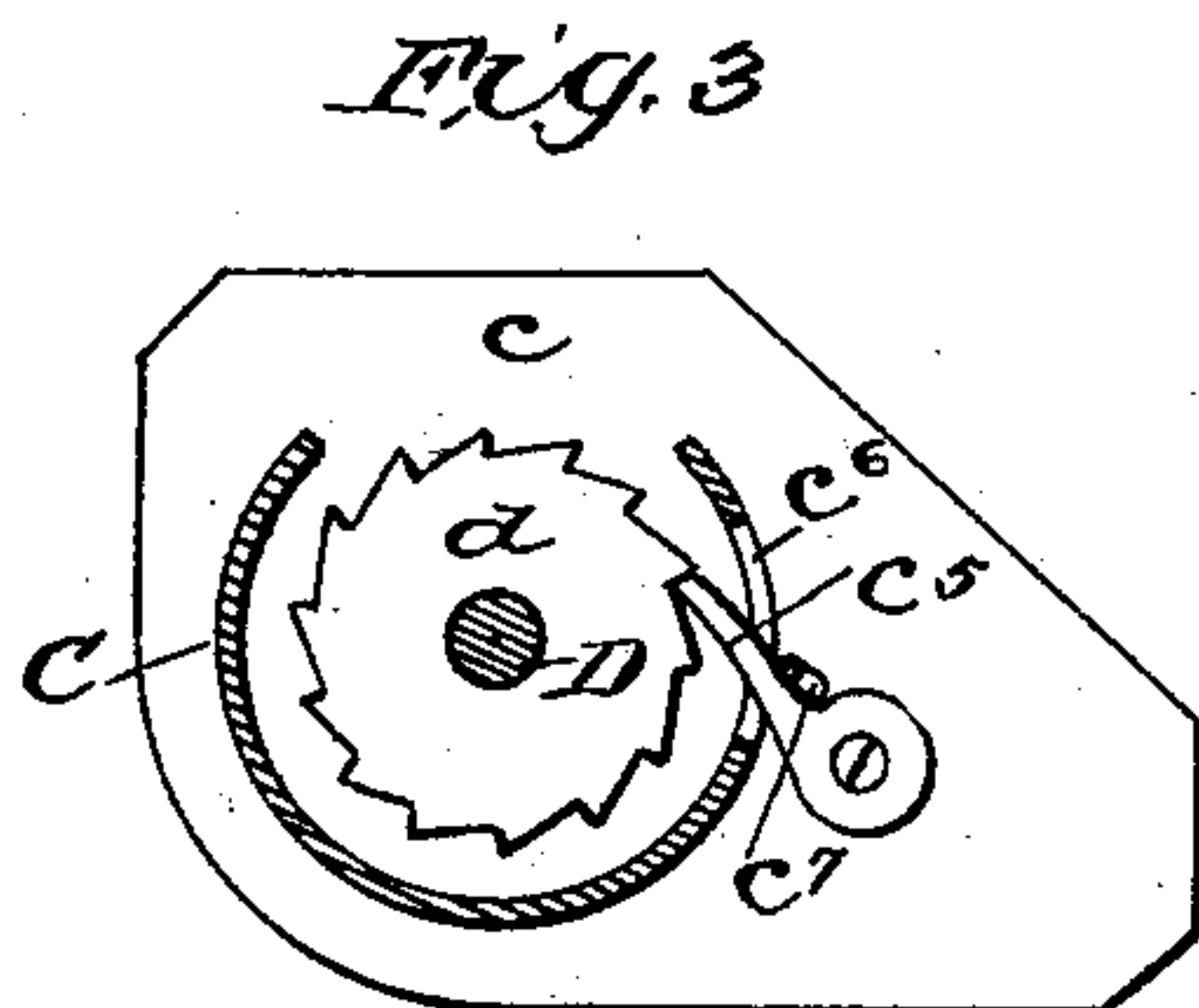
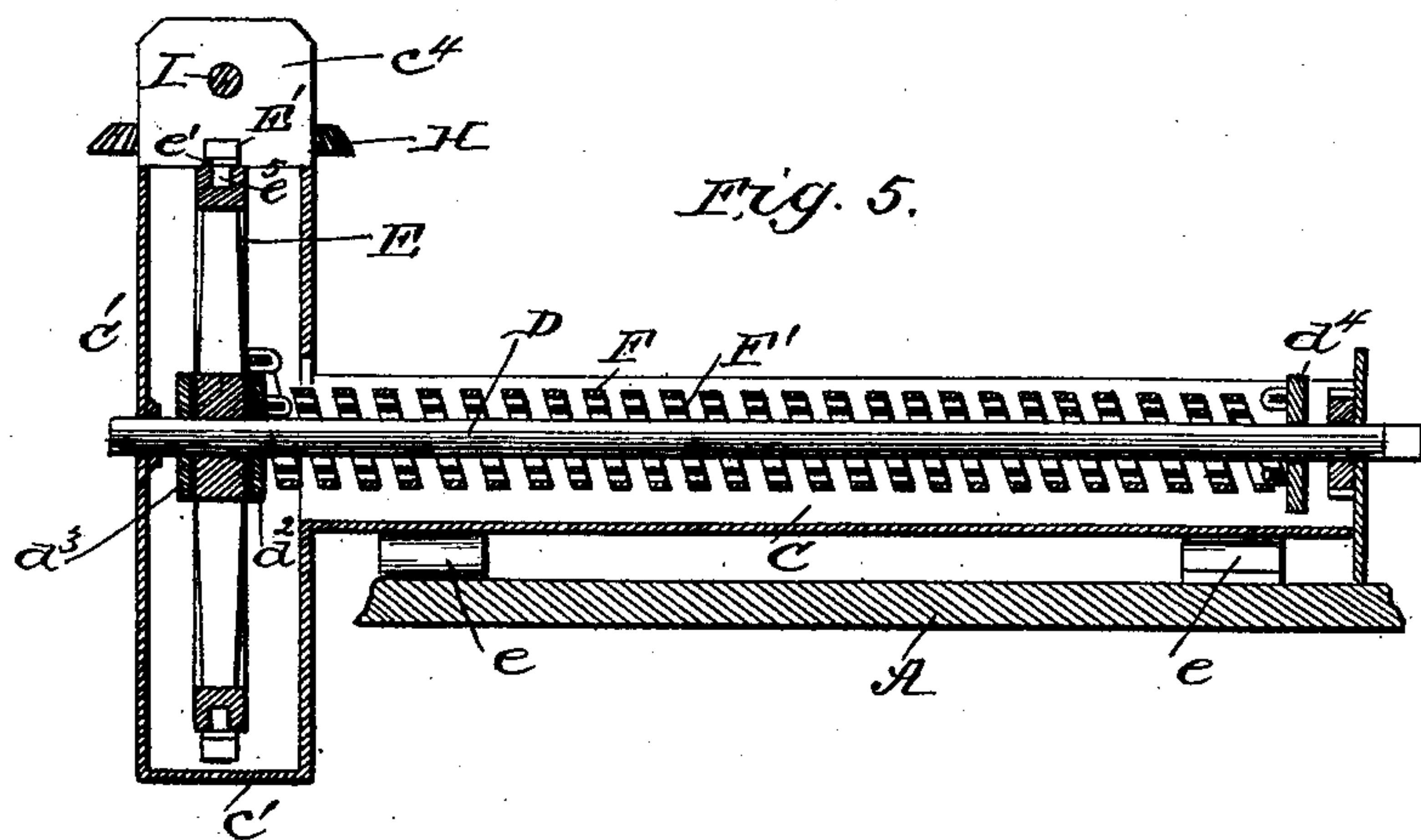
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UNITED STATES PATENT OFFICE.

GEORGE R. SMITH, BENJAMIN F. COLLINS, AND JAMES W. SHOOK, OF
ELIZABETHTOWN, KENTUCKY.

SEWING-MACHINE MOTOR.

SPECIFICATION forming part of Letters Patent No. 435,328, dated August 26, 1890.

Application filed December 13, 1889. Serial No. 333,818. (No model.)

To all whom it may concern:

Be it known that we, GEORGE R. SMITH, BENJAMIN F. COLLINS, and JAMES W. SHOOK, citizens of the United States, residing in Elizabethtown, in the county of Hardin and State of Kentucky, have invented certain new and useful Improvements in Sewing-Machine Motors, of which the following is a specification.

Our invention relates, generally, to sewing-machine motors, and particularly to that class thereof known as "spring-actuated" motors, its object being to produce a device of the class described that shall be simple and durable in construction and one that is efficient in operation and can be wound while in operation.

Our invention consists in a horizontal shaft suitably mounted on the sewing-machine table and adapted to be revolved by means of a spring, a worm-wheel mounted upon said shaft provided on its periphery with a series of radially-projecting anti-friction pins or rollers adapted to engage with a vertical worm-shaft, said shaft being connected by suitable gearing with the revolving shaft of the sewing-machine mechanism.

Our invention consists, further, in the novel construction and combination of the various parts, as will be more fully hereinafter described and claimed.

In the drawings forming a part of this specification, and in which similar letters of reference indicate the same or corresponding parts, Figure 1 is a top plan view of our improved motor. Fig. 2 is a vertical section taken on the plane of the line 2 2 of Fig. 1. Fig. 3 is a detail sectional view of the power-shaft casing, ratchet-disk, and pawl, taken on the plane of the line 3 3 of Fig. 1. Fig. 4 is a detail sectional view of one of the anti-friction pins; and Fig. 5 is a vertical longitudinal sectional view of our motor, showing a modified form of winding-spring.

Referring to the drawings, A indicates the sewing-machine table, B the machine, and *b* a pulley rigidly secured to the main shaft of

the said machine. All of these parts are of the usual or any approved construction, as our motor is equally well adapted for use upon all classes of machines.

While it is not essential, we prefer to inclose our device in a suitable casing, in order that it may be conveniently and quickly applied, and when not in use can be laid aside without liability of any of the parts being broken or misplaced. The casing consists of a horizontal tubular portion C, closed at its forward end by means of a bearing block or plate *c*, said block being perforated centrally, and is extended beyond and below the tubular portion, the purpose of which will appear farther on. The rear end of the tubular portion is left open, and to said opened end is attached a vertical box-like casing C', and at the point where the tubular horizontal and vertical portions are joined a circular opening is made in the side of the vertical portion the same size as the bore of the tubular portion. If desired, the vertical box-like portion may be made in the shape of a right parallelopiped; but for the sake of compactness we have made said portion with a curved side *c*², said curved side being extended slightly above the casing proper. The tubular horizontal portion is provided on either side with laterally-projecting lugs or ears *e*, said ears being attached to or formed integral with the under side of the tubular portion, whereby the motor-casing is secured transversely across the machine-table.

Journaled within the tubular portion, extending entirely through the same and the vertical box-like portion, is a horizontal shaft D, said shaft being journaled in the bearing-block *c* at the forward end of the tubular portion and in the rear side of the box-like casing.

Near the forward end of the shaft D within the tubular portion a ratchet-disk *d* is rigidly secured upon the shaft, and near the rear end within the box-like portion a worm gear-wheel E is loosely mounted upon the shaft, suitable washers or disks *d*² and *d*³ being arranged, re-

spectively, in front and behind said wheel, said washers being rigidly secured to the shaft D.

Around the shaft D is coiled a spiral spring F, said spring being of stout flat steel, the forward end being secured to the ratchet-disk d and the rear end connected to the webbing of the worm gear-wheel E.

The worm-gear in our improved motor consists of a series of pins E' set into the periphery of the wheel, each pin consisting of a shank e and an annular collar e' , intermediate the ends of the same, and upon the outer end of the shank is placed an anti-friction roller E'' , said roller being secured upon the pin by slightly spreading the outer end of said pin to enter an annular groove e^2 in the outer face of the anti-friction roller.

At the end of the box-like casing opposite the extended side c^2 is secured a horizontal bearing-plate c^3 , and to the inner end of said plate is attached a vertical bearing-plate c^4 , and, if desired, said bearing-plates may be of one piece, the plate c^3 being perforated vertically and the plate c^4 horizontally, the extended side c^2 being also perforated horizontally in alignment with the plate c^4 , the purposes of which will appear farther on.

Within the vertical box-like casing and to one side of the worm-wheel is journaled a vertical worm-shaft G, said shaft being journaled between the bearing-plate c^3 and a recessed post g , secured to the bottom of the casing, the worm G' of said shaft being adapted for engagement with the anti-friction roller E'' on the worm gear-wheel. The upper end of the worm-shaft extends beyond the bearing-plate c^3 , and upon said end is placed a bevel-gear H.

Passing through the bearing-plate c^4 and extended side c^2 is a horizontal shaft I, and upon the end adjacent to the bevel-gear H is secured a gear-wheel K, adapted for engagement with said bevel-gear, and upon the opposite end of the shaft I is mounted a pulley L, which is connected with the pulley b by a band or belt l .

To the inner face of the projected or extended portion of the bearing-block c is pivoted a pawl c^5 , said pawl working through an aperture c^6 made in the side of the tubular portion C, said pawl engaging the ratchet-disk d and held in place by means of a spring c^7 , secured to the outer side of said tubular portion.

Upon the end of the shaft D is placed a crank M for winding the spring which operates the motor.

In Fig. 5 we have shown a modified form of spring mechanism, consisting of two spiral springs F F' coiled around the shaft D, the spring F' being secured at its forward end to a loose disk d^4 and at its rear end to the washer-disk d^2 , while the spring F is secured

as already described, except that the forward end is secured to the loose disk d^4 .

In a spring mechanism constructed as described, when the shaft D is revolved by means of the crank M the disk d^2 winds the first spring F', and when this is wound taut the disk d^4 becomes rigid and winds the second spring F, when the machine is wound ready for use, the disk d^4 having a ratchet periphery the same as d and engaged by the pawl c^5 in the same manner as already described. We also employ a suitable brake N, which bears upon a face-pulley N', arranged upon the shaft I, said brake being operated in any preferred manner.

The various parts of our device being constructed and assembled, as described, the device is operated as follows: The casing carrying the motor is secured transversely across the sewing-machine table adjacent to the fly-wheel of the machine, the horizontal tubular portion being secured to the table by screws passing through the laterally-projecting ears on the sides of said portion, the vertical box-like portion resting beyond the rear edge of the table. An endless band or chain is then placed upon the pulleys b and L and the motor is wound by turning the crank M.

When it is desired to start the machine, the lever governing the brake is thrown down and the brake out of engagement with the face-pulley, and the spring in unwinding revolves the worm gear-wheel, which in turn operates the worm-shaft, thereby revolving the gear carried on said worm-shaft, and the pulley-shaft I is given the required rotary motion, which drives the main shaft of the machine.

The advantages of our improved motor are that it is cheap and simple in construction, is durable and compact, can be quickly attached to and detached from any sewing-machine, and on account of the peculiar construction of the worm gear-wheel friction of the device is reduced to a minimum. Our device can also be wound while in operation.

Having thus described the construction, operation, and advantages of our improved device, what we claim as new, and desire to secure by Letters Patent, is—

1. In a motor, the combination, with a worm-gear, of a horizontal shaft upon which said gear turns loosely, a ratchet-disk rigidly secured to one end of said shaft, a spiral spring coiled around the shaft and connected at one end to the ratchet-faced disk and at the other to the worm-gear, a vertical worm-shaft arranged for engagement with the worm-gear, a gear carried by said shaft, a horizontal shaft carrying a gear at one end and adapted to engage with the gear of the worm-shaft, and a pulley at the other end of said horizontal shaft, as and for the purpose described.

2. In a motor, the combination, with a shaft,

of a worm gear-wheel loosely mounted there-
on, a washer-disk rigidly secured to the shaft
near its rear end, a ratchet-disk loosely
mounted upon the shaft near its forward end,
5 a spiral spring coiled around the shaft con-
nected with the loose ratchet-disk and rigid
washer-disk, and a second spiral spring coiled
around the shaft connected at its forward
end with the loose ratchet-disk and at its
10 rear end with the worm gear-wheel, and the

worm-shaft arranged for engagement with
the worm gear-wheel, substantially as shown
and described.

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