(No Model.)

G. BANCROFT.

VARIABLE FRICTION GEAR FOR SPINDLES.

No. 267,053. Patented Nov. 7, 1882.

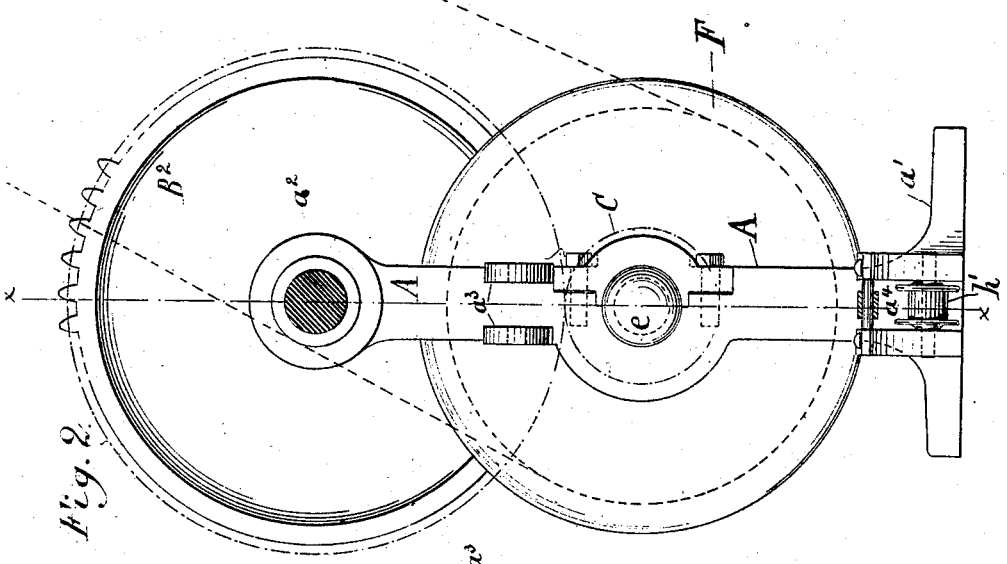

Fig. 2.

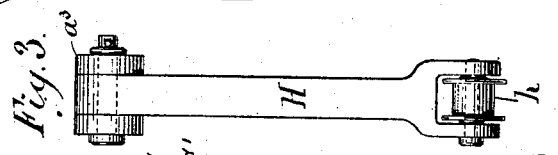

Fig. 3.

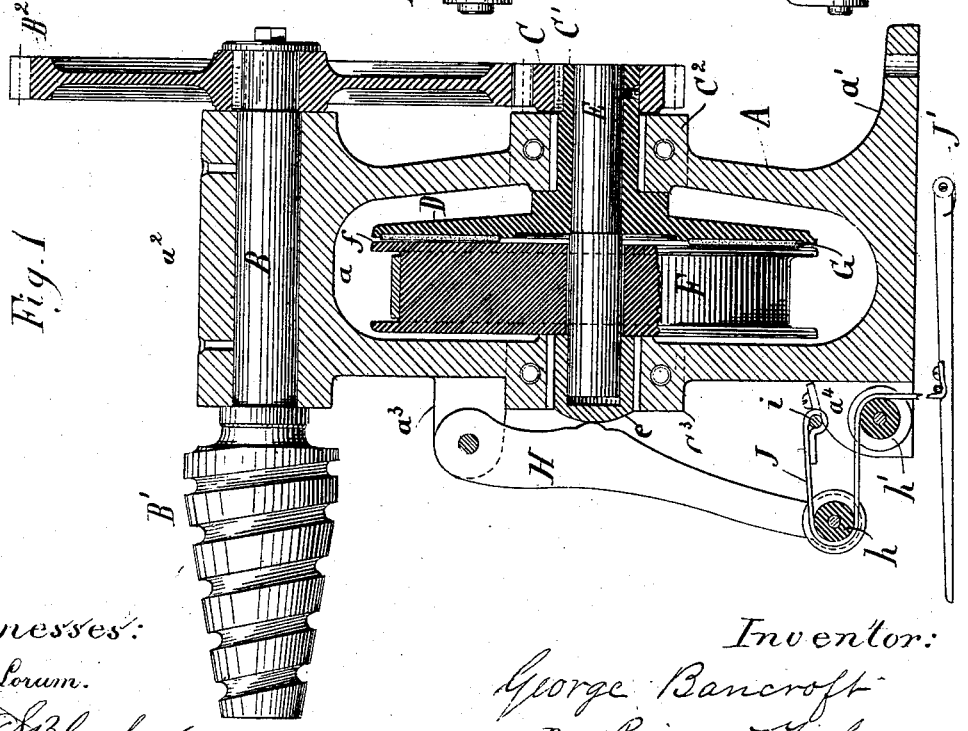

Fig. 1.

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UNITED STATES PATENT OFFICE.

GEORGE BANCROFT, OF EVANSTON, ILLINOIS.

VARIABLE FRICTION-GEAR FOR SPINDLES.

SPECIFICATION forming part of Letters Patent No. 267,053, dated November 7, 1882.

Application filed August 19, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEORGE BANCROFT, a citizen of the United States, residing at Evanston, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Variable Friction-Gears for Spindles, of which the following is a specification.

I shall now proceed to describe my invention as applied to a machine for forming spiral springs, although it is obviously capable of general application.

In the manufacture of spiral springs—such, for example, as are commonly employed for beds, upholstery, and like purposes—it has been found desirable in practice that the movement of the former upon which such springs are coiled should be subject throughout the entire operation to the control of the operator, so that it may at will be gradually started or stopped or moved with variable speed, and especially is this the case in machines for forming conical or like springs, in which the formers are not of a uniform size throughout their lengths. For this reason it is the common practice to connect the former by means of suitable gearing with a crank, which the operator turns with one hand while he guides the wire with the other.

The object of my present invention is to provide an improved machine, which may be driven by power, and in which the speed of revolution of the former or work-holder can be varied or stopped at pleasure, the hands of the operator being left free for controlling the work. This object I have accomplished by the mechanism hereinafter described, illustrated in the accompanying drawings, and particularly defined in the claims at the end of this specification.

Figure 1 is a view of the machine in vertical section on line *x x* of Fig. 2. Fig. 2 is a side view of the machine. Fig. 3 is a detail of the lever for operating the friction-gear.

A designates the standard of the machine, which is cast in such manner as to form the long central space, *a*, the base *a'*, and the enlarged upper portion, a^2. Within this upper portion, a^2, is carried the spindle B, to the end of which is connected the "former" B', of any desired shape, and to its opposite end is fixed the large gear-wheel B^2. Meshing with this gear-wheel B^2, and below the same, is the small gear-wheel, C, which fits over and is keyed to the sleeve C', held within the journal-bearing C^2. The sleeve C' is formed in one piece with the back of the friction-plate D, and is provided with an annular shoulder, *d*, which bears against the journal-seat C^2. Through a central perforation in the plate D and the sleeve C', and fixed therein, passes the spindle E, the opposite end of which is journaled within the cup-shaped sleeve *e*, held in the seat C^3 in a manner free to slide. Within the cut-away space *a* of the standard, and upon the spindle E, is loosely journaled the pulley F, which is constantly driven by a suitable belt from the source of power. One side of this pulley constitutes a friction-surface, *f*, and between this surface and the friction-plate D, and within a suitable annular seat in the latter, is preferably interposed one or more annular friction-disks, G, of paper, leather, or other suitable material.

Upon one side of the standard A, below the spindle B, are formed the lugs a^3, to which is pivotally hung the lever H, provided centrally with an enlargement adapted to bear against the top of the cup-shaped sleeve *e*, and having at its end the friction-roller *h*. Within a recess, a^4, in the base of the standard is journaled the friction-roller *h'*, and over the rollers *h* and *h'* passes the chain or belt J, suitably attached at *i* to the standard, and connecting the lever H with the treadle J', by means of which the lever is operated.

Having thus described the construction of my machine, I shall now define its mode of operation.

When the end of the wire of which the spring is to be formed is connected in the ordinary way to the end of the former B', the operator depresses the treadle J', which bears the lever H, against the sleeve *e*, and causes it to move the pulley F, which in turn forces the disk G against the friction-plate D. As the pulley F is constantly rotating, it is obvious that its motion will be communicated to the friction-plate when the two bear upon the interposed paper disk G, the degree of movement and power imparted being proportionate to the friction between the two. Thus, when but a slight

pressure is exerted on the treadle, the frictional contact between the plate D, the surface *f* of the pulley, and the interposed disk will be correspondingly small, and the movement communicated by the friction-plate to the former B′ through the gear-wheels will be very slow. On the other hand, this movement, it is apparent, may be increased and varied at pleasure by a variance of the pressure upon the treadle. By this construction of machine the hands of the operator are free to guide the wire in forming the springs, and the former can be rotated rapidly or slowly, or can be stopped at any desired stage of the operation.

My invention, while particularly applicable to machines for forming spiral springs, may be usefully applied in many other connections where there is a former or work-holder upon a spindle to which it is desirable to give a variable speed while the power driving the machine continues constant.

I am aware that variable friction-gears have been heretofore constructed and applied to the driving-shafts of sewing-machines, winding-drums, and the like, and I do not therefore wish to be understood as broadly claiming the same. I am not aware, however, that before my invention a variable friction-gear has been combined with a spindle having a free end and adapted to carry a former, whereby the movement of the former could be controlled at pleasure.

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

1. The combination, with the spindle carrying upon its free end a former, of the gear-wheels, the driving mechanism, and the variable friction-gear, substantially as described.

2. The combination, with the spindle B, of a friction-plate, D, constantly connected therewith, a movable friction plate or surface constantly connected to the driving mechanism, and means, substantially as described, for forcing said friction-plates together, as set forth.

3. The combination, with the spindle B, of the friction-plate D, the belt-pulley F, having the friction-surface *f*, the lever H, and treadle J′, all substantially as described.

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Witnesses:

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