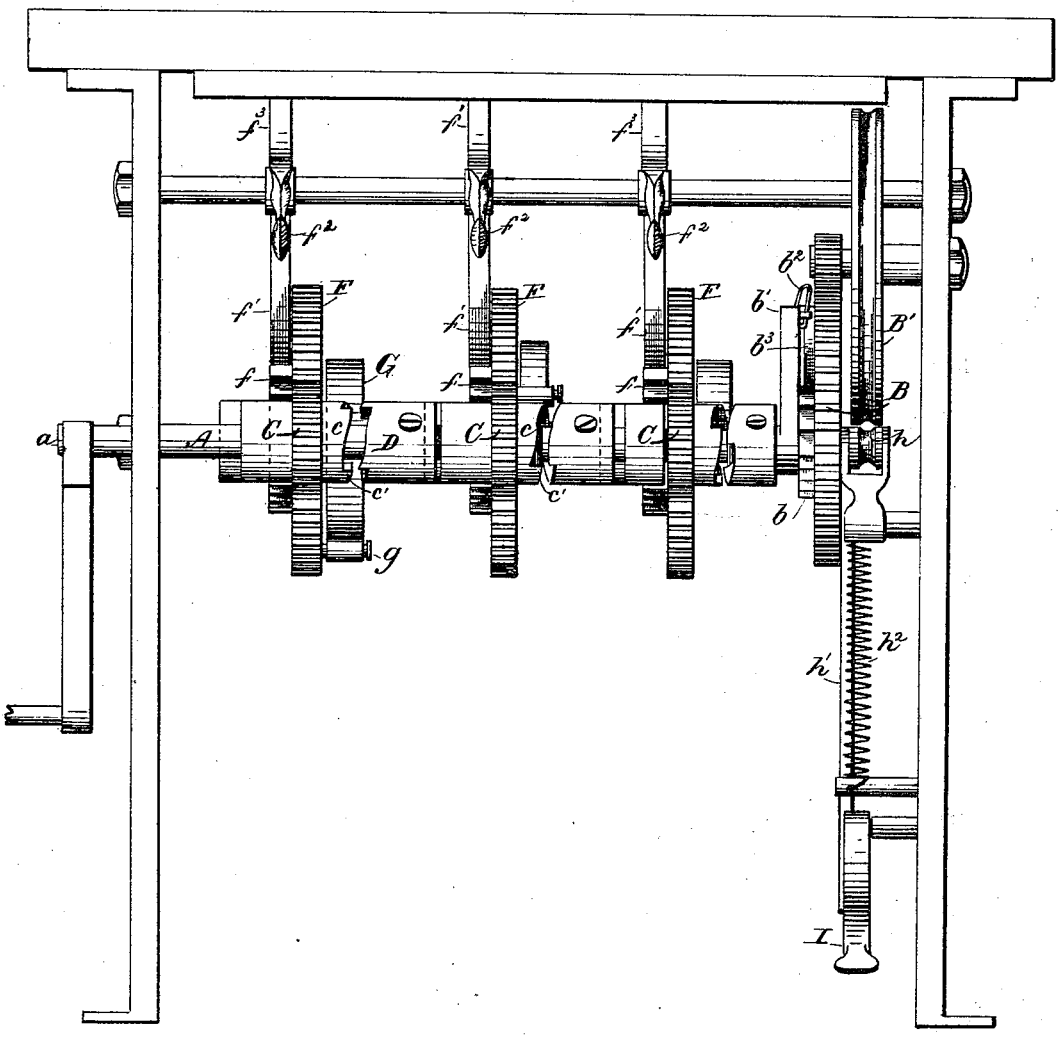
2 Sheets--Sheet 1.

J. H. BEAN.

Motors.

No. 166,331. Patented Aug. 3, 1875.

Fig 1.



Witnesses;

Harry G Clark

James J. Finley.

Inventor.

Joseph H. Bean.

by N. W. Beadle Esq his Attys

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

2 Sheets--Sheet 2.

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Fig 2.

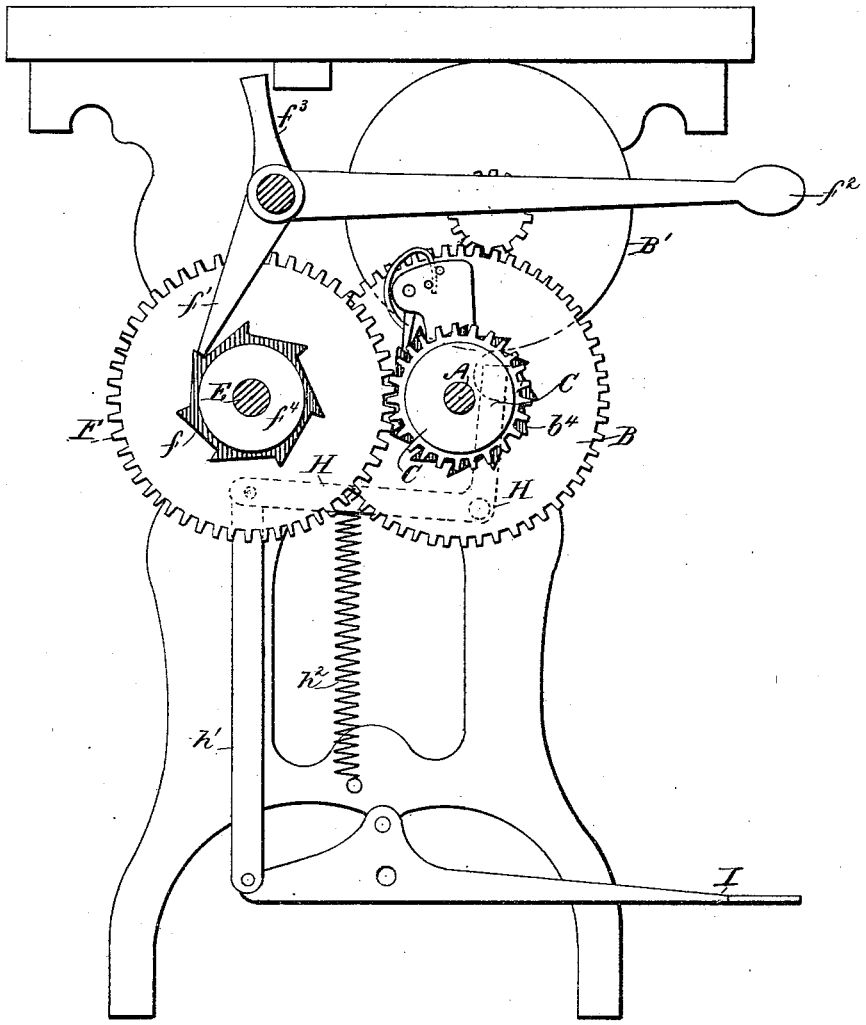


Fig 3

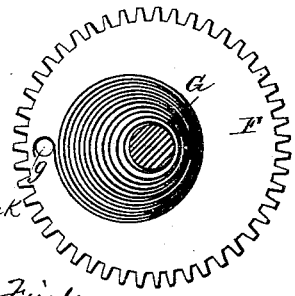
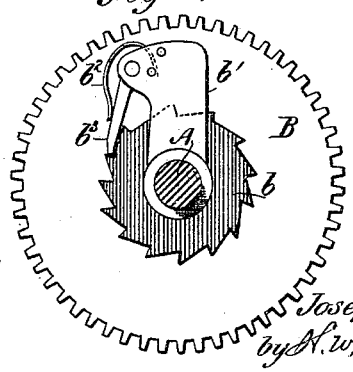


Fig 4.



Witnesses;

Harry C Clark

James J Finley

Inventor.

Joseph H. Bean.

by H. W. Beadle & Co.

his Attys.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOSEPH H. BEAN, OF CINCINNATI, OHIO.

IMPROVEMENT IN MOTORS.

Specification forming part of Letters Patent No. **166,331**, dated August 3, 1875; application filed July 20, 1875.

To all whom it may concern:

Be it known that I, JOSEPH H. BEAN, of Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Improvement in Motors; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention is a motor which is adapted, in consequence of its special construction, to continue in motion for a great length of time without the employment of a spring of great power; and its novelty consists, mainly, in the combination of a series of independent springs of suitable power with a series of independent clutches and a single winding and actuating shaft, the construction being such that by a continuous revolution of the shaft, the springs may be independently and successively wound without the exertion of special strength. The power from the springs, when wound, may be used also in successive order until the entire series has run down.

In the drawings, Figure 1 represents a front elevation of my machine; Fig. 2, an end elevation, partially in section; and Figs. 3 and 4, detail views.

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

A represents the winding and actuating shaft, supported in suitable bearings, and provided at one end with the square portion *a*, adapted to receive the winding-key. B represents a gear-wheel, loosely fixed upon the shaft near one end, which engages directly, or by means of intermediate gearing, with the pinion of the driving-pulley B′. *b*, Fig. 4, represents a ratchet-wheel located upon one face of the wheel B, as shown. b^1 represents an arm rigidly attached to shaft A, which is provided with the spring b^2 and pawl b^3, by means of which the revolutions of the shaft A, when moving in the proper direction, are communicated to the gear-wheel B and the driving-pulley, for the purpose of actuating the machinery with which it is connected. C C C represent any suitable number of pinions located upon the shaft at regular and proper distances apart, which are loosely held thereon, so far as revolution with it is concerned, but are not free to move in a longitudinal direction. *c* represents a hub extending from one side, which is provided with clutch-teeth *c′*, as shown. D D represent sleeves, corresponding in number with the pinions C C, and located adjacent thereto upon the shaft A, which are so secured to the shaft as to revolve therewith, while free to move in a longitudinal direction. E represents an auxiliary shaft, which is rigidly held in any proper supports. F F represent a series of gear-wheels, loosely held upon the shaft E, which engage with the pinions C C, as shown. *f*, Fig. 2, represents a ratchet, forming a part of one face of each wheel, and f^1 a catch-pawl, provided with a lever-arm, f^2, for disengaging it from the ratchet when desired, and a stop-arm, f^3, for limiting its movement, as shown. f^4 f^4 represent collars, by means of which the gear-wheels are held against longitudinal displacement upon the shaft. G G represent a series of coiled springs, each of which is secured at one end to the fixed shaft E, and at the other to a stud, *g*, extending from one face of the gear-wheel F, as shown. H represents a bell-crank lever properly pivoted to any suitable support, which is provided at one end with the grooved friction-roller *h*, Fig. 1, and attached at the other to the connecting-rod h^1, Fig. 2, as shown. h^2 represents a spring suitably secured at its ends to a fixed support, and the arm of lever H, by means of which the friction-roller is kept in contact with the face of the pulley-wheel, as shown. I represents a treadle-lever, the short arm of which is attached to the lower end of the connecting-rod h^1, its long arm being extended into proper position to be conveniently reached by the operator, as shown.

The operation of the machine is as follows: The winding-key having been placed upon the square end *a* of the shaft A, the latter may be revolved in the proper direction without affecting the gear-wheel B, the pawl b^3 of which slips freely over the ratchet-wheel *b* without giving movement to the same. Neither will any spring be affected unless its corresponding sleeve D is caused to engage with the clutch-face of its pinion C. If, however,

any one or more of these clutch-sleeves D be so moved in a longitudinal direction upon the shaft as to engage with the clutch-teeth of its pinion C, the movement of the shaft will consequently be communicated to the gear-wheel F, by means of which the spring G, attached thereto, will be properly wound up.

The springs are preferably wound separately, and in successive order, for the purpose of reducing the amount of strength required to wind them, the operation being substantially as follows: The springs being unwound and the clutches out of gear, the first may be wound by causing its clutch upon the revolving winding-shaft to engage with its pinion, by means of which proper motion is communicated, when the winding-shaft is revolved, to the gear-wheel and its spring. When wound the spring is held from unwinding by moving the catch-pawl f^1 into contact with its ratchet-wheel f, the clutch D being disengaged for the purpose of disconnecting the spring from the winding-shaft. The second and following clutches may then be successively thrown into gear and be treated in a similar manner.

When all are wound any one of the springs may be connected by means of its clutch to the winding-shaft, and the catch-pawl being disengaged, its power will be communicated to the pulley-wheel by the intermediate mechanism described. This wheel, however, cannot revolve because it is held by the pressure of the brake; but if this be removed by depressing the foot-treadle, motion will be given to the machine. When the power of any one spring has been exhausted its clutch may be disconnected from the winding-shaft, and the clutch of the next be caused to engage with its pinion, in consequence of which it may be used in a similar manner. If desired, however, two or more, or all the springs, may be employed at the same time by throwing the clutches into gear and disengaging the clutch-pawls.

Some of the advantages of the construction described are as follows: By the employment of independent springs of suitable power, adapted to be successively used, motion for a great length of time is obtained without employing any one spring of great power. By the employment of a series of springs of suitable power each one may be separately wound without the exercise of great strength.

By the employment of the treadle and brake, arranged as described, the motor is held at rest in its normal condition, so that the power cannot be wasted, and when in motion its speed may be regulated to a nicety.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The combination of a series of independent springs, a series of independent clutches, the non-rotating shaft, and a single winding and actuating shaft, substantially as described.

This specification signed and witnessed this 19th day of July, 1875.

JOSEPH H. BEAN.

Witnesses:

JAMES J. FINLEY,

C. A. BRAINERD.