2 Sheets—Sheet 1.

J. M. CAYCE.

MOTIVE POWER.

No. 107,221.

Patented Sept. 13, 1870.

Fig. 1.

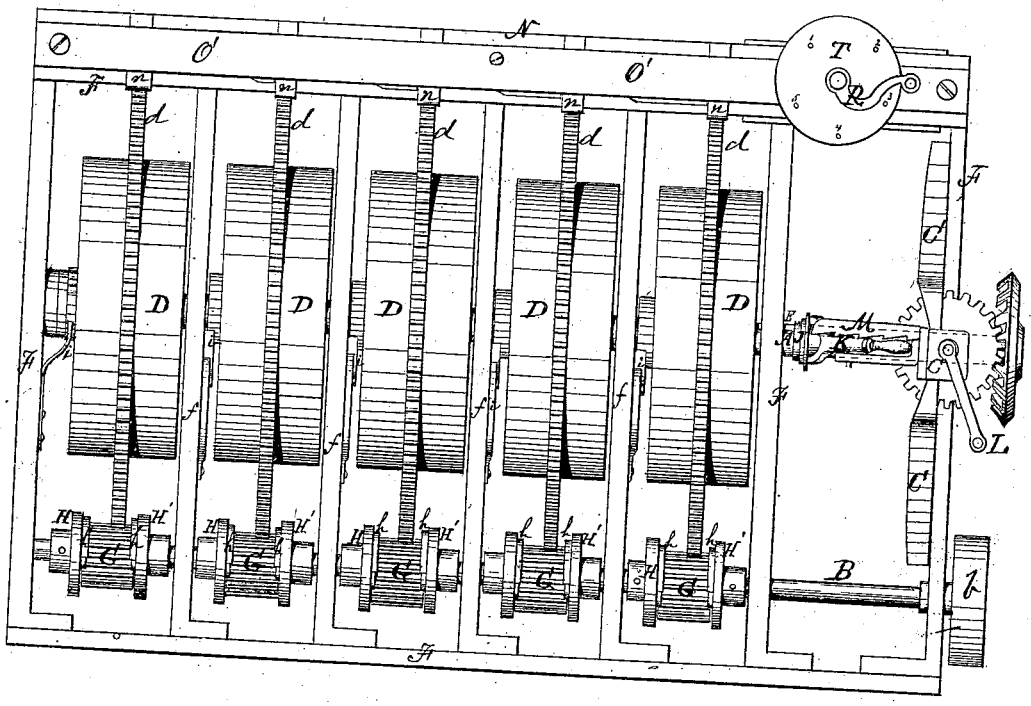


Fig 2

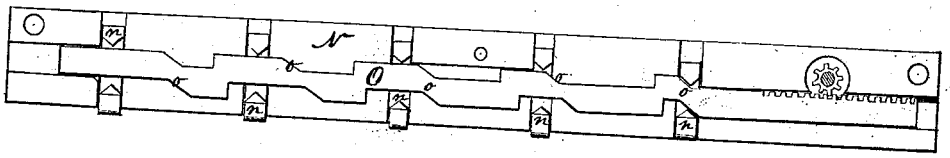
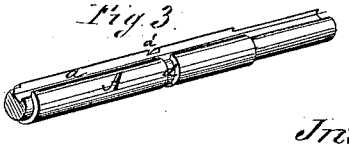


Fig. 3.



Witnesses.

H. J. Arey

Solon A. Fremon

Jno M. Cayce. Inventor.

by Munn & Co

his Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

2 Sheets—Sheet 2.

J. M. CAYCE.

MOTIVE POWER.

No. 107,221. Patented Sept. 13, 1870.

Fig 4

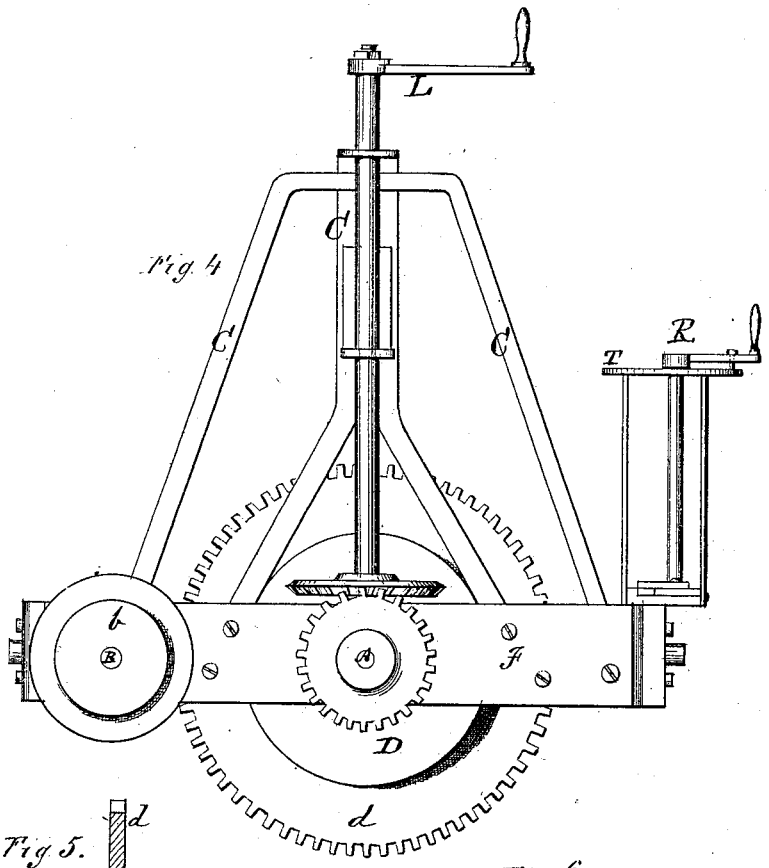


Fig 5.

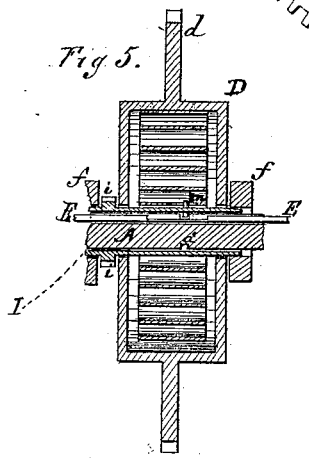


Fig. 6.

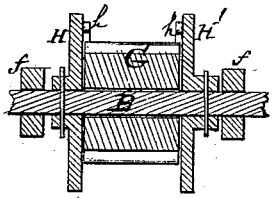
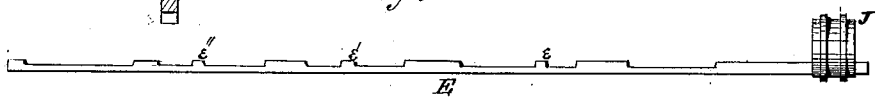


Fig 7



Witnesses
H. J. Street
Solon C. Kemon

Inventor
Jno. M. Cayce
by Munn & Co
his Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

United States Patent Office.

JOHN M. CAYCE, OF FRANKLIN, TENNESSEE.

Letters Patent No. 107,221, *dated September* 13, 1870.

IMPROVEMENT IN MOTIVE-POWER.

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, JOHN M. CAYCE, of Franklin, in the county of Williamson and State of Tennessee, have invented a new and improved Combination Spring-Power; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 represents a top view.

Figure 2, a plan of the cut-off apparatus, detached, and the cover removed.

Figure 3, a perspective view of a portion of the main shaft.

Figure 4, an end elevation.

Figure 5, an axial section of one of the large wheels in position on the main shaft.

Figure 6, an axial section of one of the small wheels in position on the small shaft.

Figure 7, a side elevation of the rod by which the several large wheels are, at the will of the operator, thrown into or out of gear with their shaft.

The object of this invention is to provide for public use a spring power so constructed that any required number of springs may be employed, winding up by the same shaft, but independently of each other. In applying their power to the working shaft, the operator can, at will, use any one, or any number of the springs at the same time, so that, although a force sufficient to overcome only one spring is necessary to wind up the apparatus, yet the combined power of all the springs is available whenever needed, or they may be used separately, one after the other.

This object is accomplished by means of the mechanism which I will now proceed to describe.

In the drawing—

F represents the frame of the apparatus, which is shown as a rectangular frame with a number of parallel cross-pieces, *f f*.

I do not deem the shape or construction of the frame material, and may use any kind of frame which I find best adapted to support the various parts of the machine.

The frame F supports two shafts, A and B, from the latter of which the power is applied whenever needed, by means of a pulley, *b*, and a belt, or by any other mechanical means in common use for a similar purpose.

The power of the apparatus is obtained from springs coiled in a series of barrels, D, working independently of each other on the shaft A.

Each barrel has a cog-rim, *d*, affixed to it, by which the power of its spring may be communicated to a small gear-wheel, G, on shaft B, and thence to the belt-pulley *b*.

The gear-wheels G G, like the barrels D D, run independently of each other, being hung loosely on their shaft between two fixed collars, H H', and having a pawl, *h*, to prevent their turning loosely on the shaft, except in one direction.

The method of attaching the barrels to the shaft A is as follows:

A longitudinal groove, *a*, is made in the shaft, in which slides a rod, E, formed as shown in fig. 7.

A grooved ring, J, is attached to one end of the rod E, engaging with a bifurcated hand-lever, K, by which the rod can be moved back and forth in its bed.

Each barrel rests not directly on the shaft A, but on a short sleeve or hollow shaft, I, inclosing the shaft A, as shown in fig. 5.

A pawl and ratchet, *i*, are employed near the end of the sleeve, to check the recoil of the spring when winding or wound.

A groove, *a'*, is cut around the main shaft, near the center of each barrel, and in this groove plays a little pin, *m*, that projects from the inner side of the sleeve, as seen in fig. 5.

It is obvious that, so long as there is no obstacle to break the continuity of groove *a'*, the shaft A can be rotated independently of the sleeves I I and of the barrels, but when the rod E is moved along so that some of the projections *e e'* upon its face extend across the grooves *a' a'*, then the pin *m* will engage with the projection *e*, and the shaft will not turn without turning the sleeve I and winding up the mechanism.

The projections *e e' e''* are so arranged along the rod E that when the latter is slid to a certain position the first one, *e*, extends across the first groove *a'*, and enables the first spring apparatus to be wound up; but no other projection, *e' e''*, &c., is then across its groove, and, consequently, no other spring is wound up.

When the first spring has been fully wound, the rod E is moved along till another projection, *e'*, comes across its groove, and then the second spring can be wound up, and the third and fourth, &c., in the same manner, each by itself, requiring the use of but little power to wind up the whole machine.

The projections *e e' e''* are just long enough to extend across the grooves *a' a'*, and bear slightly against the shoulders of metal formed at the intersection of grooves *a a'*, so as to receive their support in withstanding the power of the spring.

The hand-lever K, which sets the rod E properly to wind one or another spring, is held in place by a rack, M, the notches of which may be numbered so that when the lever is set in notch No. 1, the first spring will wind, when in No. 2, the second, &c.

In connection with the devices above described, I employ an adjustable locking apparatus or cut-off, the nature of which will be clearly understood from figs. 1 and 2, its object being to place the several spring apparatus, when they are all wound, so under the con-

trol of the operator that he can use one, two, three, or any other number of springs at once, according to the amount of power that may be necessary.

The cut-off operates by locking the cog-rims *d d* in the following manner:

In a grooved bed-plate, N, are a series of dogs, *n n' n''*, which can be made to project so as to come in contact with the cogs of the rims *d d*, and prevent the barrels from rotating.

A sliding-rod, O, with inclines, *o o'*, properly arranged upon it, moves back and forth in a longitudinal groove in plate N, passing transversely through open or closed slots in the sliding dogs *n n* in such a manner that as the rod O is moved forward the inclines *o o'* upon it will first advance one dog, then another, then another, &c., in the regular order, and when the rod is correspondingly withdrawn it will withdraw the dogs in the same manner.

When, therefore, the operator does not wish to employ the first spring, he moves the rod O forward till it advances dog *n*, and thus locks the first wheel; if he desires to lock two wheels, he advances the rod O another step, and so with any number or all of the wheels and springs.

The apparatus can thus not only be wound up one wheel at a time but it can be unwound or used as a motive-power in the same manner, if preferred, or none of the springs being locked, their united power may be employed.

The rod O may be covered by a strip, O', to keep it in place, and a rack and wheel or crank, R, may be used to operate it.

When these are used, an index-plate, T, marked with figures 1, 2, 3, &c., may be employed to show whether one, two, three, or more of the springs are cut off.

When any spring is thus cut off and its barrel and cog-rim held fixed during the operation of the machine, the cog-wheel G, connected with it on shaft B, will necessarily be stopped, but the action of the shaft B, by the influence of the other springs will not be interfered with, since the gear-wheels G G, it will be remembered, are loose on that shaft, operating upon it only by means of the ratchets and pawls *h h*, pawls only may be employed, the cog-rim of wheels G, serving as a ratchet.

A hard wheel and lever, L, may be used to wind the main shaft, if preferred, and may be supported in any kind of convenient frame, C, as shown in fig. 4.

I do not restrict myself to any particular number of springs apparatus in my combination, that depending entirely on the amount of power to be employed; nor do I confine myself to the use of the cog-rims springing from the middle of the convex surface of the barrels, although that arrangement is the best possible for strengthening the barrels, preventing injury when springs break, obviating any tendency of the springs to warp or twist the barrels, &c.

The dogs *n n* may be single, or may be constructed like segments of internal gear-wheels, if preferred.

Having thus described my invention,

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

1. The combination of shaft A, rod E, sleeve I, and spring-barrel D, forming a single spring apparatus, when constructed to operate substantially as and for the purposes described.

2. The combination of two or more of said spring apparatus with each other, when the shaft A and rod E are so constructed that by moving the rod along, it will adjust the several springs to be wound independently of each other, substantially as and for the purpose described.

3. The combination of each spring apparatus, consisting essentially of the parts A I D E *m i d*, with the shaft B, and the apparatus G *h* H H', substantially as and for the purposes specified.

4. In combination with the several cog-rims *d d d*, the cut-off O *o* N *n*, constructed to operate substantially as and for the purpose specified.

JOHN M. CAYCE.

Witnesses:

JAMES H. GRIDLEY,

SOLON C. KEMON.