

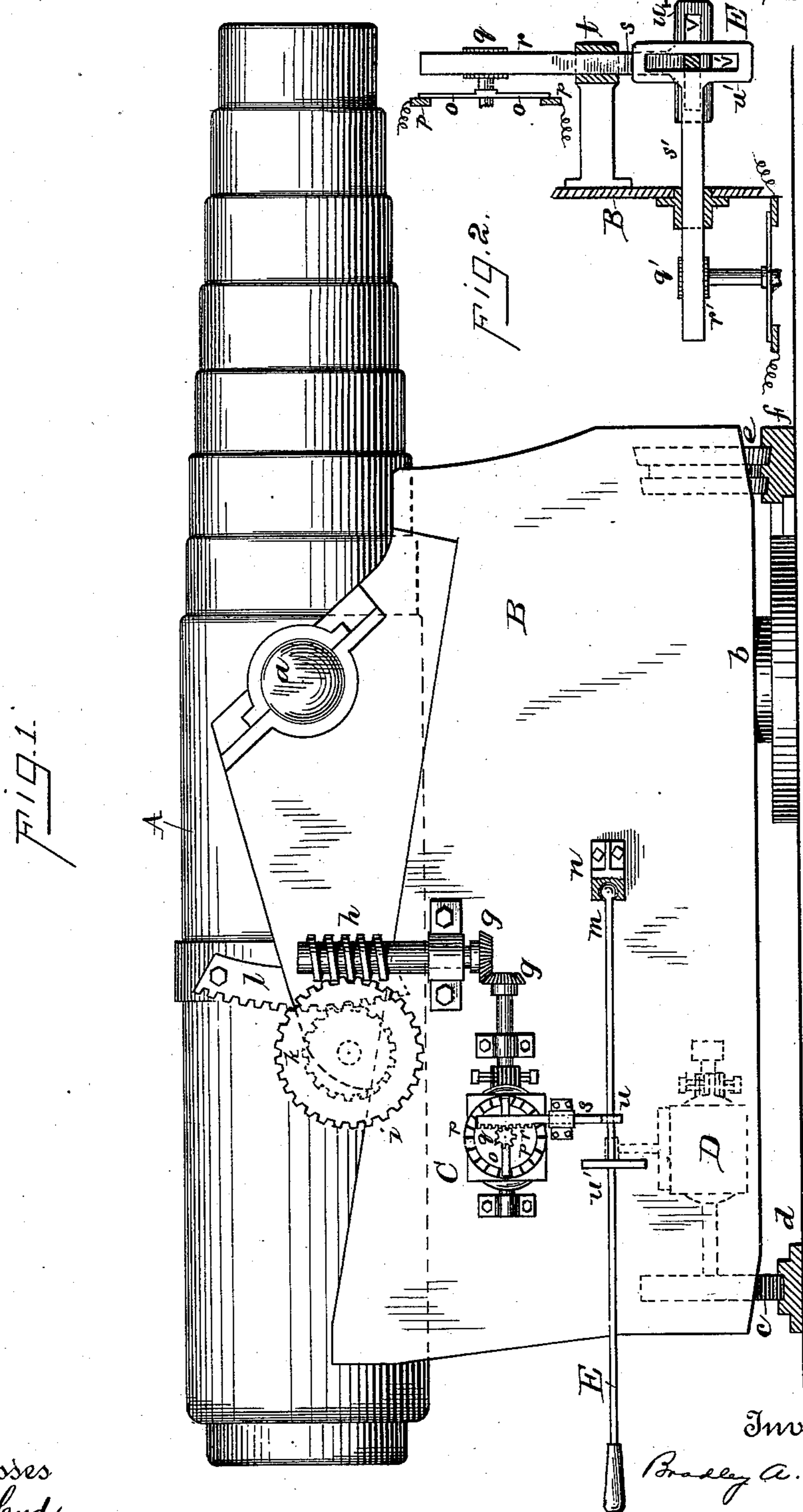
(No Model.)

2 Sheets—Sheet 1.

B. A. FISKE.
DEVICE FOR REGULATING MOTIVE POWER.

No. 558,724.

Patented Apr. 21, 1896.



Witnesses
E. Rowland.
William Peyer

Inventor
Bradley A. Fiske
By his Attorneys J. S. Long

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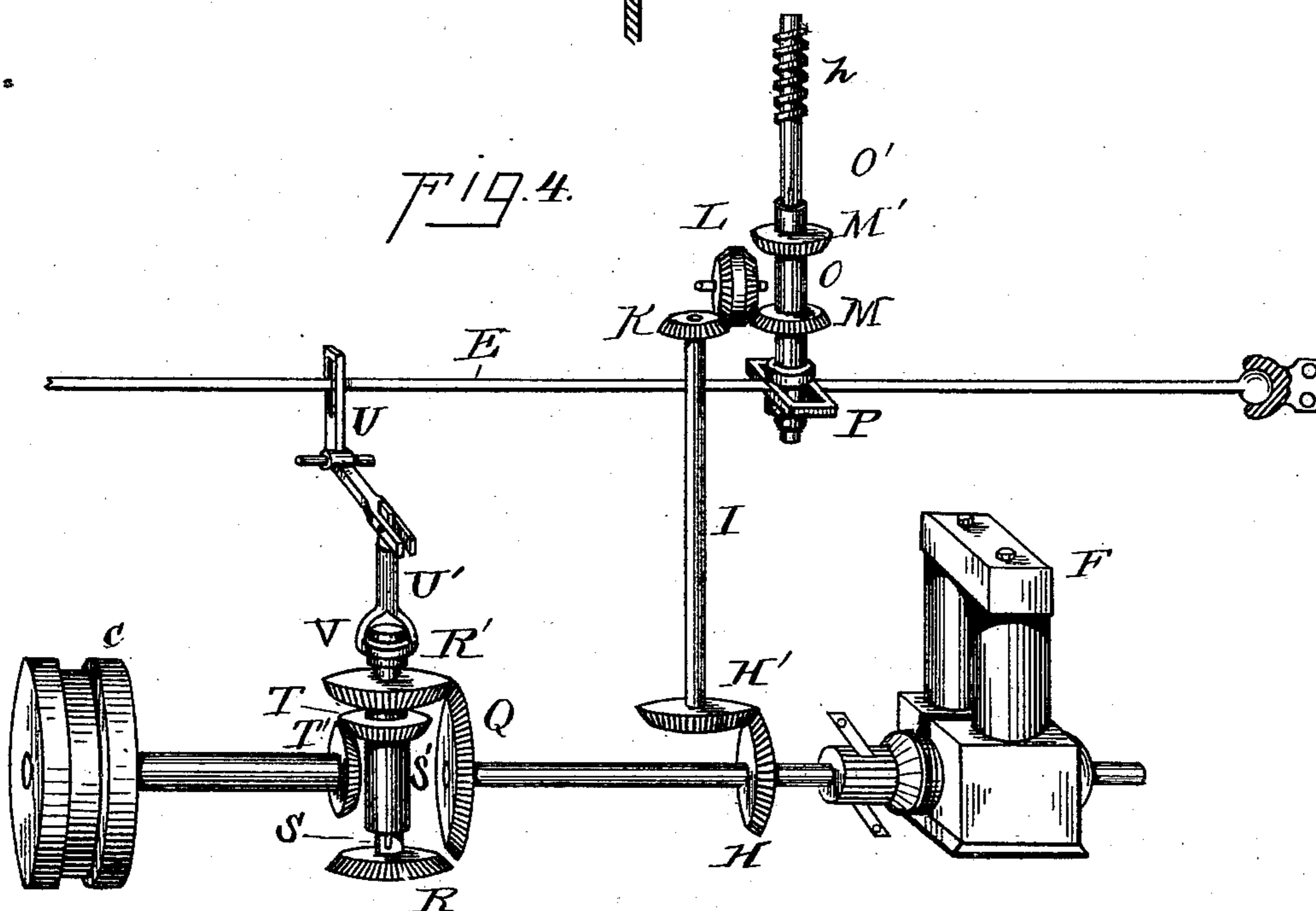
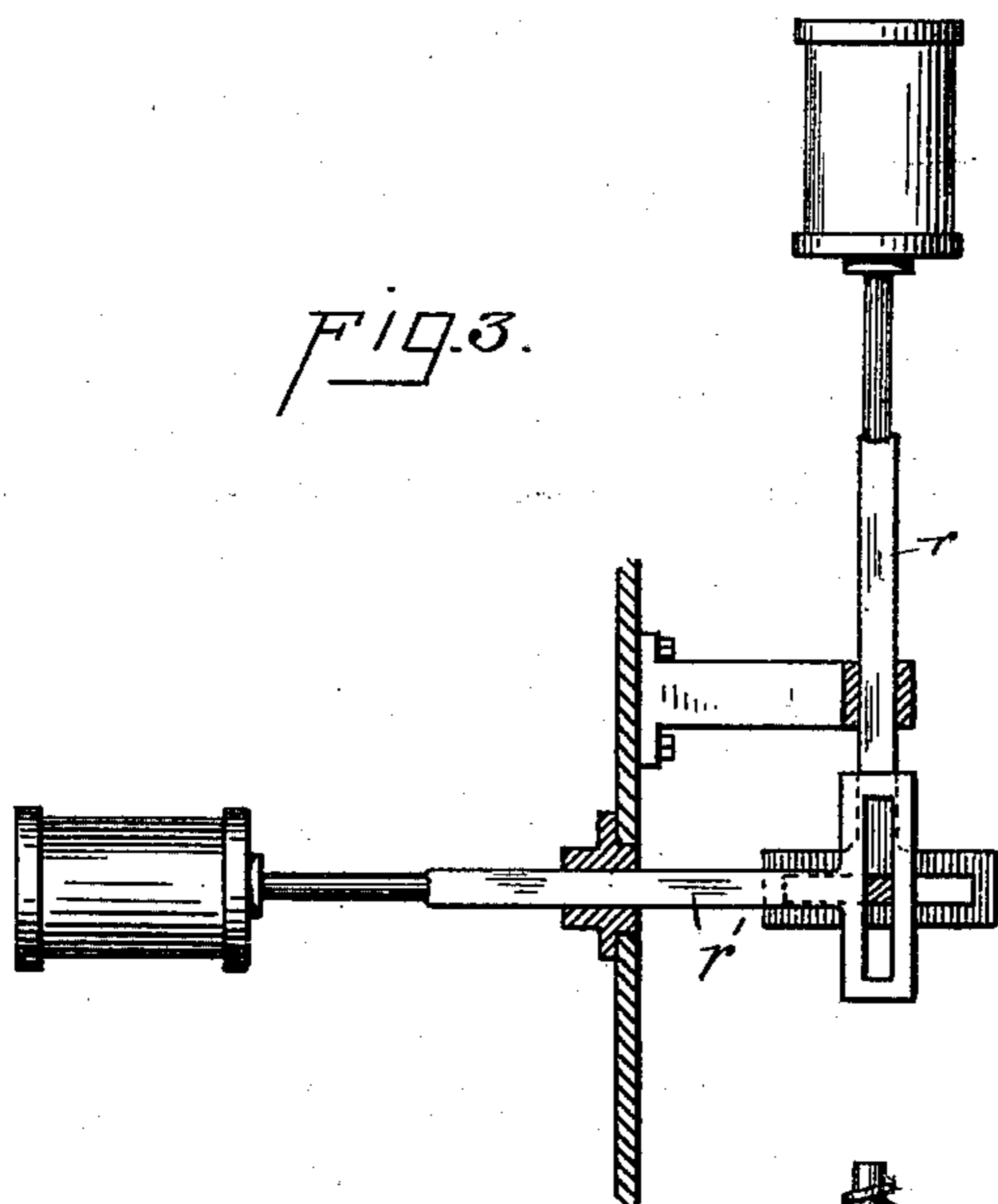
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UNITED STATES PATENT OFFICE.

BRADLEY A. FISKE, OF THE UNITED STATES NAVY.

DEVICE FOR REGULATING MOTIVE POWER.

SPECIFICATION forming part of Letters Patent No. 558,724, dated April 21, 1896.

Application filed September 10, 1888. Serial No. 285,014. (No model.)

To all whom it may concern:

Be it known that I, BRADLEY A. FISKE, of the United States Navy, and a citizen of the United States, have invented a certain new and useful Improvement in Devices for Regulating Motive Power, of which the following is a specification.

My invention relates to the use of power for moving or operating machines or bodies which are capable of movements in two or more different planes, such—for instance, as heavy guns, which require to be moved horizontally and also vertically, cranes, and other hoisting and conveying apparatus, &c.

The object of my invention is to control the motive power so as to give all the different movements required for the driven machine or body by the manipulation of a single arm, handle, or lever, and, further, to cause the movements of the driven body to conform or correspond to those of the controlling-arm—that is, so that an upward movement of the arm will so affect the motive power as to cause the body to move upward, a downward movement will move the body downward, movements to the right or left will give similar movements to the body, and oblique movements, when such are required, will cause the body to move in the same oblique direction.

My invention consists in part in a novel apparatus for communicating the movements of the arm, handle, or lever to the controlling devices of the motive power, whereby the objects above named are accomplished in a simple and effective manner; and, further, my invention consists generally in so combining and arranging a single motor in connection with a machine or body of the character mentioned and suitable power connections that the different movements of such body are all produced by the single motor, as hereinafter more particularly set forth and claimed.

My invention is especially designed for use in connection with electric motors; but it is also adapted to be used with fluid-pressure motors, as will be explained.

In the accompanying drawings, Figure 1 is a view representing a gun arranged to be operated by two electric motors by means of the controlling apparatus which forms part of my invention; Fig. 2, a rear view and partial

section of the controlling apparatus. Fig. 3 illustrates the application of the invention to fluid-pressure motors, and Fig. 4 the arrangement for a single motor provided with two power connections.

Referring first to Figs. 1 and 2, A represents a gun, which is pivoted at *a* upon a carriage B, the carriage being itself placed upon a vertical pivot *b* and arranged to be turned by the engagement of a toothed wheel *c* with a stationary curved rack *d*. The front end of the carriage has wheels *e* running on a rail *f*.

An electric motor C is provided for elevating or depressing the gun. The shaft of said motor is geared, by bevel-gears *g g*, with the shaft of a screw or worm *h*, which engages a toothed wheel *i*, carrying a pinion *k*, which engages a curved rack *l* on the side of the gun. The motor C is supported, as shown, upon the side of the carriage. Another electric motor D, placed underneath the gun, between the sides of the carriage, carries upon its shaft the wheel *c*, by which the gun and carriage are swung upon the pivot *b*.

E is an arm or lever attached, by means of a ball-and-socket joint *m* or other universal joint, to a lug or projection *n*, extending from the side of the carriage.

Each electric motor is provided with a controlling-switch, which, as shown, is of that well-known form in which two arms *o o* travel over a circular range of contact-blocks *p*, having a central position at which circuit is broken to the motor and the armature stands still, while the movement of said arm in either direction closes circuit in one or the other direction to the motor and causes the same to run in one direction or the other.

The switch of motor C is operated by a pinion *q* on the shaft of arms *o o*, with which pinion a rack *r* engages, said rack being carried by an arm *s*, and similarly the switch of motor D is actuated by a pinion *q'*, rack *r'*, and arm *s'*, said arm *s'* sliding through a bearing in the side of the carriage. The arm *s*, which slides through a bearing *t*, supported from the gun-carriage, has at its lower end a cross-head *u*, having a slot *v* at right angles to the length of the arm, and through this slot the arm E passes. In line with slot *v*,

but at right angles thereto, is the slot v' in the cross-head u' of the arm s' , and the arm E passes also through said slot v' .

The operation of these devices is as follows:

5 If both switches are at their central position and both motors are at rest, and if it is desired to raise the breech of the gun, the arm E is raised, and such arm while it moves through the slot v' so as not to affect the arm
10 s' engages with the side of slot v and moves arm s so as to turn the switch-arms and start the motor C in such a direction as to impel the breech upwardly. Similarly if the arm is moved down it will start the motor so as
15 to lower the breech of the gun, and in either case when the proper elevation is reached the return of the switch to its central position stops the motor and the gun at that point. These operations, as will be seen, will all be
20 performed without affecting the motor D in any way. When, however, it is required to train the gun and carriage transversely upon the pivot b' , the arm E is moved to one side or the other according to the direction in
25 which the gun is to be moved, and such arm will then move freely in the slot v , but will engage with the slot v' so as to move the arm s' and turn the switch of motor D, so as to start said motor in the right direction; and said
30 motor will be stopped again by bringing arm E back to its normal position.

It will be seen that the position of the gun on its pivot a does not affect the action of the motor D, and neither does the position on vertical pivot b affect the operation of motor C.
35

It will be seen, further, that both motors may be made to run together, whereby the gun will move in an oblique line by moving the arm E obliquely in the required direction,
40 whereby said arm will engage with both slots v and v' and turn both the motor-switches.

In Fig. 3 the arms r and r' are shown as arranged to operate the valves or other controlling parts of the fluid-pressure motors.

45 Fig. 4 shows an arrangement wherein only one motor is employed both for raising and lowering and for horizontally moving the driven body. F is the motor. Upon its shaft is a bevel gear-wheel H, engaging with a wheel
50 H', whose shaft I carries a bevel-gear K. This engages with one face of the double gear-wheel L, whose other face is adapted to engage with either of the bevel-gears M and M', according to whether the sleeve O, which is
55 keyed on the shaft O', is raised or lowered on the shaft. Shaft O' terminates in screw h , which may operate as described with reference to Fig. 1.

It should be understood that in Fig. 4 the
60 controlling apparatus is shown as to be placed on the opposite side of the gun from that on which it is shown in Fig. 1.

The sleeve O is raised and lowered by means of the arm E, universally hinged at m , as before explained. This arm carries a slotted
65

cross-arm P, through which the sleeve O passes, having a collar on each side of the cross-arm. When the arm E is moved laterally, it does not affect the sleeve O, since the shaft O' slides in the slot; but when the
70 arm is raised it lifts the sleeve into the position shown in the drawings, with the wheel M engaging with wheel L and receiving motion therefrom in such direction as to raise the breech of the gun; and when the arm E
75 is lowered the wheel M' engages with L, and by turning the screw in the opposite direction causes the breech of the gun to be lowered. The shaft of motor F also carries a bevel gear-wheel Q, which is adapted to engage with
80 either the wheel R or wheel R', these wheels being on a shaft S, which slides through a stationary sleeve S'. Sleeve S' carries a gear-wheel T, engaging with a wheel T', which gives motion to the driving-wheel c .
85

The arm E passes through a vertical slot in the end of a bent pivoted arm U, whose horizontally-extending end is joined to a vertical arm U', which terminates in a collar V, encircling the shaft S between two flanges on
90 the shaft. It will be seen, therefore, that the vertical movement of arm E, by which the elevation of the gun is controlled, does not affect the shaft S; but a lateral movement of said arm either raises or lowers the said shaft
95 S and causes either wheel R or wheel R' to come into engagement with wheel Q, whereby wheel c is turned and the driven body is propelled in the required direction. The bevel-gears H H' will work through an opening in
100 the side of the gun-carriage.

It is evident that placing the slot in a cross-arm on the controlling-lever is mechanically equivalent to placing it in the arm moved by
105 said lever and passing the lever through it.

What I claim is—

1. The combination of a body or apparatus movable in divergent planes, a single motor, two separate power connections from said
110 motor to said body or apparatus each for giving it one kind of movement, and a single universally-pivoted arm engaging both said power connections and controlling the same, whereby all the movements of said body are
115 given it by the single motor and controlled by the single lever, substantially as set forth.

2. The combination of a gun which is pivoted so as to move vertically and laterally, separate power connections for giving it each
120 kind of movement and a single universally-mounted controlling lever or handle normally arranged substantially parallel with said gun and so connected with said power connections that as the lever is moved in any direction
125 the gun will partake of movement in the same direction, substantially as set forth.

3. The combination of a gun which is pivoted so as to move both vertically and laterally, separate power connections for giving it
130 each kind of movement, arms having slots in

line and at right angles to each other, each of which arms is connected with and controls one of said power connections, and a single universally-mounted controlling lever or handle passing through both of said slots normally arranged substantially parallel with said gun and so controlling said power connections that as the lever is moved in any di-

rection, the gun will partake of movement in the same direction, substantially as set forth. 10

This specification signed and witnessed this 5th day of September, 1888.

BRADLEY A. FISKE.

Witnesses:

WILLIAM PELZER,
A. W. KIDDLE.