

(No Model.)

3 Sheets—Sheet 1.

R. MACKIE.

APPARATUS FOR SELECTING AND OPERATING MECHANICAL DEVICES.

No. 507,148.

Patented Oct. 24, 1893.

FIG. 1.

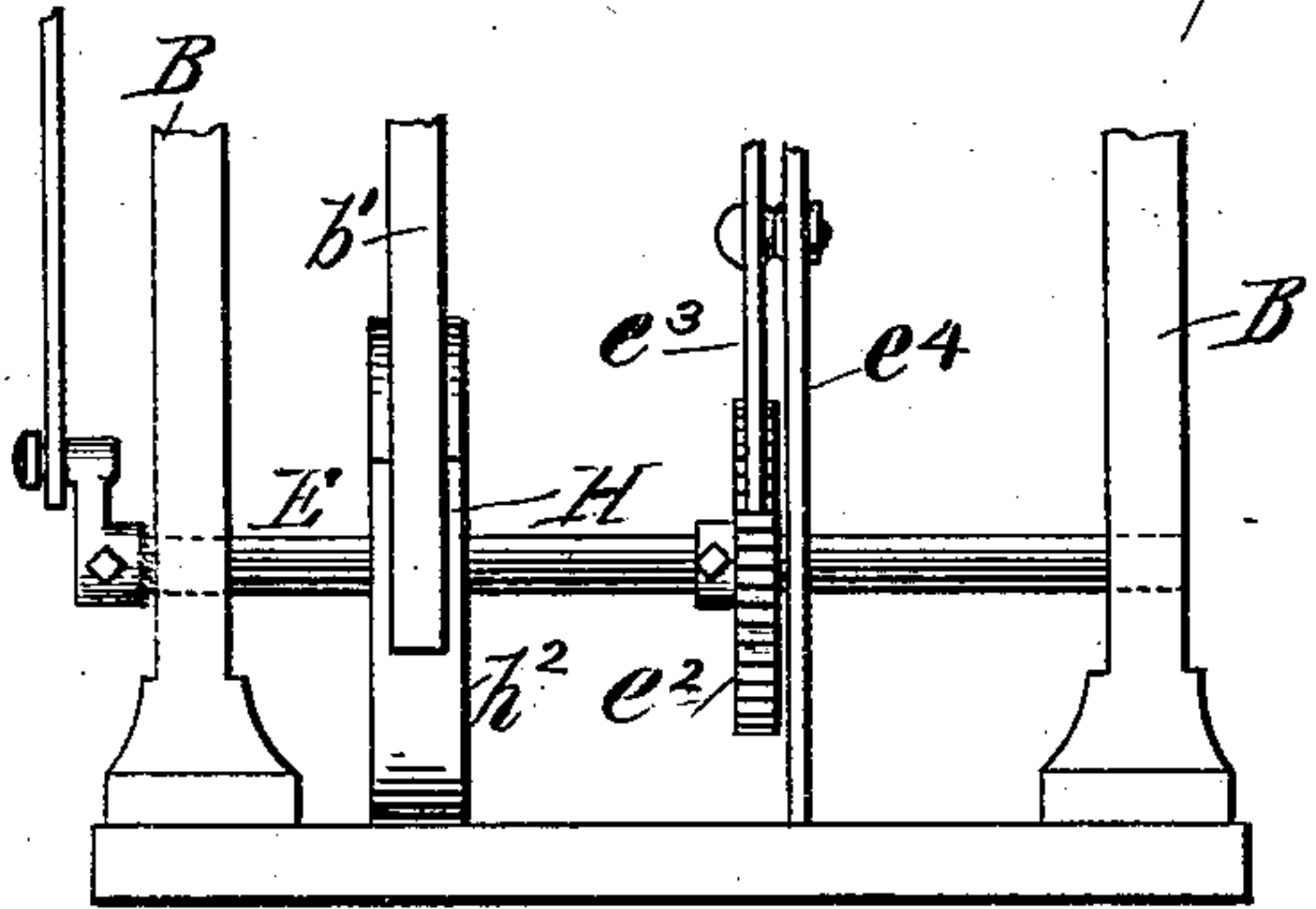


FIG. 6.

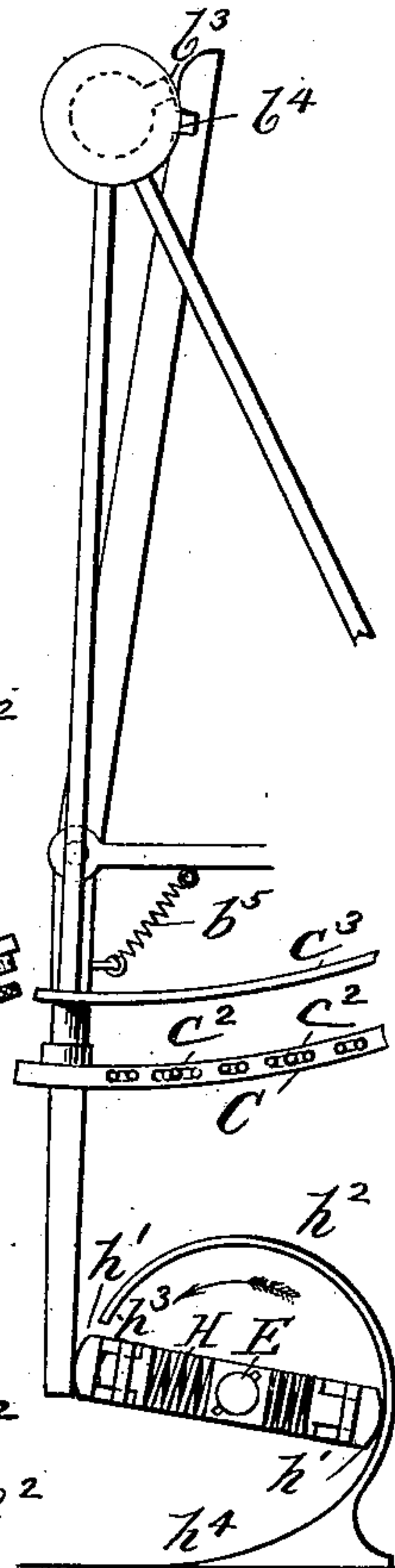
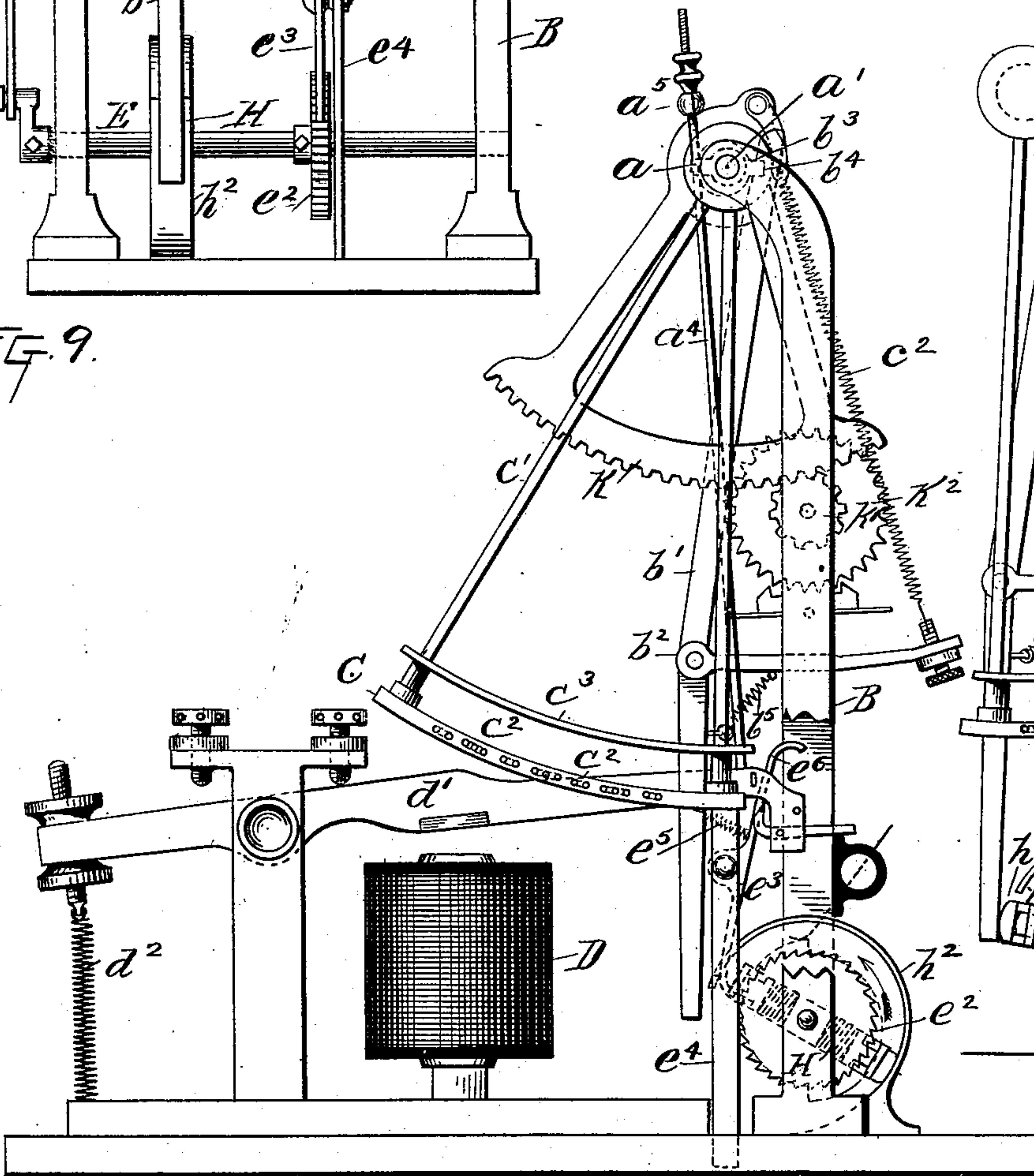


FIG. 9.



WITNESSES:

Edward C. Howland.
Frank C. Germany.

INVENTOR

Robt Mackie

BY

Price Stewart,

ATTORNEYS

(No Model.)

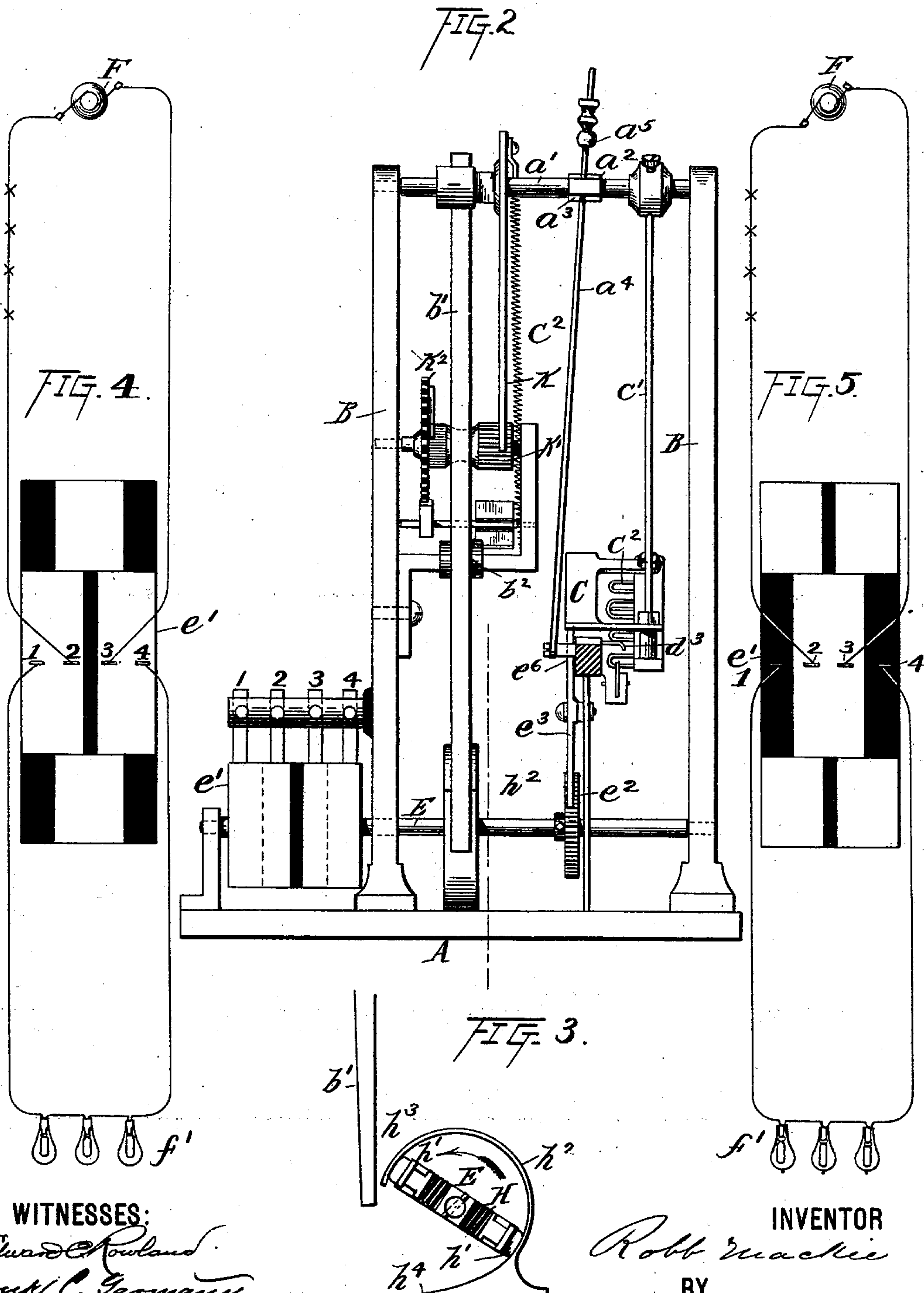
3 Sheets—Sheet 2.

R. MACKIE.

APPARATUS FOR SELECTING AND OPERATING MECHANICAL DEVICES.

No. 507,148.

Patented Oct. 24, 1893.



WITNESSES:

Edward Rowland
Frank C. Germany

INVENTOR

Robt Mackie

BY

Price & Stuart

ATTORNEYS

(No Model.)

3 Sheets—Sheet 3.

R. MACKIE.

APPARATUS FOR SELECTING AND OPERATING MECHANICAL DEVICES.

No. 507,148.

Patented Oct. 24, 1893.

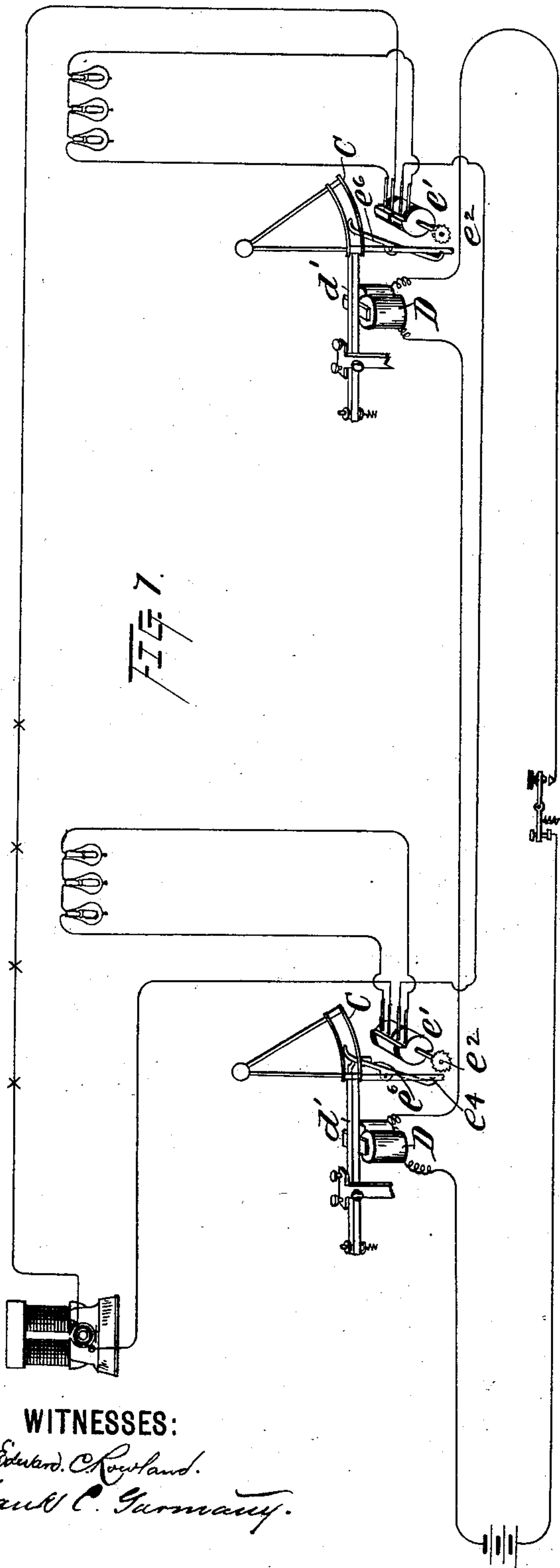


FIG. 7.

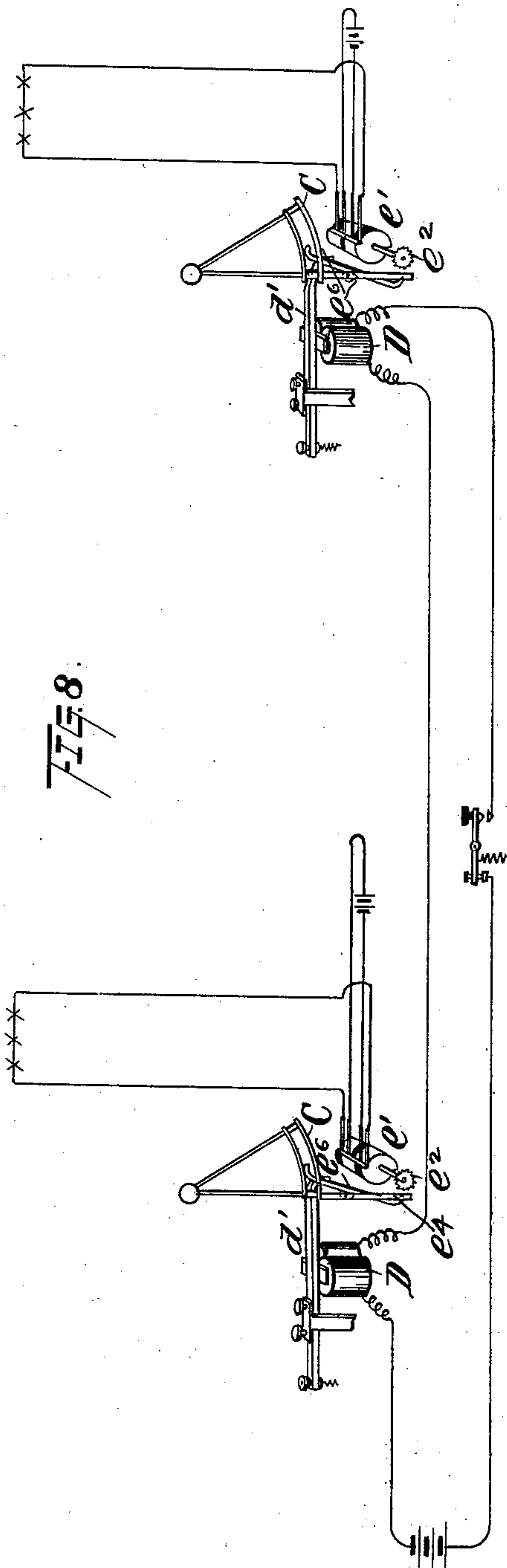


FIG. 8.

WITNESSES:

Edward C. Rowland.
Frank C. Gurnam.

INVENTOR

Robt Mackie

BY

Price Stuart

ATTORNEYS

UNITED STATES PATENT OFFICE.

ROBB MACKIE, OF CINCINNATI, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE ELECTRIC SELECTOR AND SIGNAL COMPANY, OF WEST VIRGINIA.

APPARATUS FOR SELECTING AND OPERATING MECHANICAL DEVICES.

SPECIFICATION forming part of Letters Patent No. 507,148, dated October 24, 1893.

Application filed July 14, 1891. Serial No. 399,527. (No model.)

To all whom it may concern:

Be it known that I, ROBB MACKIE, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Apparatus for Selecting and Operating Mechanical Devices, of which the following is a specification.

Figure 1, of the accompanying drawings illustrates a side elevation of the receiving instrument. Fig. 2, illustrates an end elevation of the receiving instrument forward of the magnet and showing the cylinder and brushes. Fig. 3, is a view of spring bolt and its semi-cylindrical casing; Fig. 4, a view of cylinder spread out on a plane showing position of brushes and the direction of current when lamps are in circuit; Fig. 5, a view of cylinder spread out on a plane showing position of brushes and direction of current when the lamps are out of circuit; Fig. 6, a side view of part of the apparatus showing the spring bolt which has just passed the end of casing and is beginning to throw out locking bar. Fig. 7, is a diagram showing two sets of lamps in main line circuit; arranged to be cut in or out of circuit by the receiving instrument located in an independent circuit operated by impulses thereon. In this figure the lamps to the left are in circuit and those to the right are cut out. Fig. 8, is also a diagram showing two sets of electric lamps in independent circuits, and receiving instruments operated by impulses from the main line, as in Fig. 7. Fig. 9, is a view of the lower part of the apparatus showing a modified structure by which the cut-out or other device may be operated by a crank on the end of the shaft.

In a patent granted to Aden A. Hatch for electric signaling apparatus, dated May 14, 1889, No. 403,104, there is described a receiving apparatus for working out a series of combination impulses in which there are shown two sets of electro magnets with their armature levers and means for shunting the current from one set to the other to return the combination sector to its starting point.

So far as the operation of working out the combination of a receiving instrument is con-

cerned, my invention does not seek to introduce any new feature, but with such a receiving instrument I combine a mechanical device or devices, and use the receiving instrument as a selecting device whereby the mechanical device is brought into co-operation with or subjected to the control of the impulses from the transmitter. Thus for example a series of semaphores having mechanical devices for exhibiting a safety signal and for reversing it to show a danger signal is connected with one of these receiving instruments; the operator first sends out the proper sequence or combination to select the semaphore he requires. The selecting instrument completes the phase represented by its arrangement of impulses; the effect of this is to subject the mechanical devices to the impulses from the transmitting instrument by which they are operated. So in a series of motors for driving machinery, one of these selecting instruments may be used to operate mechanical devices to turn off or restore the current to the motors. And the invention is illustrated in the drawings to turn a cylinder whereby an electric lamp may be lighted or extinguished, and a modification of a mechanical device is shown in Fig. 9, for operating such devices by means of a crank. Thus from the beginning to the end of the work, everything is under the control of the transmitter.

Upon a main line or independent circuit there may be erected a series of these receiving instruments, each of which may be connected with mechanical devices for operating an electric lamp. Such lamps may be numbered and as each receiving instrument responds to a predetermined arrangement of impulses the mechanical devices connected with the one selected will be first subjected to the operating or controlling impulses from the transmitter by working out the predetermined arrangement of the receiving instrument, and when thus prepared other impulses are transmitted which operate the mechanical devices. Now the line need not be confined to lamps, as it may have in the same circuit, motors or semaphores and their respective mechanical devices and each of these

may have its own number, and all of them may be thus subject to the control of the transmitter, and any one may be selected and operated at will. Ordinarily these receiving instruments are operated to the end, and close a local circuit or release a mechanical device operated by a weight or spring which when run down is again restored by hand, or again, to call a station operator who responds to the call and performs some work to enable the transmitter to proceed with some other electrical work. These instruments are therefore not under the control of the transmitter, but require additional and other aid to perform their work.

The receiving instrument is constructed upon a suitable base A, provided with the uprights B, which constitute the frame work of the apparatus. Suitably journaled in these uprights is the shaft a' , and secured to this shaft so as to rotate therewith is the sector C supported by its arms c' , which has a normal forward movement (from right to left) imparted by a spring or weight as c^2 , or other suitable motor and a backward movement returning it to starting point imparted by the armature lever of the magnet, which will be fully explained.

An electro-magnet D, shown in Fig. 1, receives the impulses from the transmitting instrument and acts upon its armature lever d' , attracting it to the pole of the magnet when the circuit is closed, and is in turn retracted by spring d^2 when opened; thus giving to this lever a movement responsive to the transmitted impulses. A series of these impulses is selected to suit the particular receiving instrument and the impulses thus sent work out the combination upon the sector of the instrument chosen, by means actuated or carried by the armature lever d' , and moving with said lever; for example; the particular sector as shown at c^2 in the drawings represent the following combination, a dot, an interval, two dots, an interval, a dot, an interval, two dots, an interval, a dot; it will be seen that between each dot and dash of the above combination there is an intervening space; as the armature lever is drawn toward the the magnet pole it actuates a pin as d^3 , which touches upon the keys of the combination, impedes its normal progressive movement forward, and holds it until the lever is again lifted, so that the sector takes a fresh start forward with each impulse; at the same time the armature lever is arrested by the keys and is thus prevented from attaining its full stroke; when however, the finger descends through one of the spaces or when the combination is entirely worked out, the armature lever obtains its full stroke and throws the sector back to starting point, in the following manner: Suitably mounted so as to vibrate with the shaft a' is a collar a^2 . This collar is provided with a projection as a^3 , which is slotted so that the rod a^4 may pass easily

through the slot, whose other end is attached to the armature lever d' , and vibrates therewith; the upper end of this rod is provided with the shoulder a^5 , which may be an adjustable nut as shown in the drawings or the collar and rod may be rigidly connected and the armature lever slotted. As the lever vibrates and its full stroke is impeded by the keys, this rod slides up and down through the slot in the projection a^3 ; but when the armature lever is released and drops upon the magnet pole, the shoulder a^5 , catches the projection a^3 , and throws the sector back to starting point.

It has been said that the armature lever would be left free to return the sector to starting point when the combination had been worked out, and this statement is ordinarily true but in my apparatus I propose to make use of the mechanism of the receiving instrument to perform mechanical work after the combination is worked out and hence I have provided means for catching and holding the sector; so that it may not be returned to starting point until this work is accomplished. It may be said therefore that in my apparatus the combination is used to set the receiving instrument, to receive other impulses to perform this work and this is done by the following devices: b' is a rod pivoted at b^2 . Its upper end is provided with a socket as shown at b^3 . Upon the shaft a' and secured to it or to the hub of the sector is a projection b^4 , which when the sector is at its starting point is in the position shown in Fig. 6; the end of the rod is held against the projection by the spring b^5 ; as the sector moves forward the top of the rod b' is pushed out by the projection b^4 , until it comes opposite to the socket b^3 , into which it drops when the sector has reached the end of its forward course, thus holding the sector in position and setting the instrument to receive the additional impulses for the mechanical work; this position is shown in Fig. 1; the armature lever d' does not as yet obtain its full stroke because its stroke is limited by the projection a^3 , and collar a^5 , and will not obtain its full stroke until the mechanical movements are given, but it has sufficient movement to do this work which is accomplished by the following means. Upon a shaft as E, suitably journaled in the frame, I have placed the cylinder e' , upon which the black spaces are insulations and the others, conductors, and on the same shaft E, a ratchet wheel e^2 , operated by a pawl e^3 , actuated or carried by the vibrations of the armature lever d' , as shown in the drawings, (Fig. 1). This pawl is pivoted to a rod e^4 , suspended from the armature lever, and its lower end is normally pressed toward the ratchet by the spring e^5 . The pawl however, has an arm e^6 , which projects above its fulcrum, and during the forward movement of the sector the upper end of this arm is in contact with a cross-bar c^3 , secured to the arms of the sector, and forms the arc

of a circle whose center is the shaft a' . When the combination has been worked out, the end of the pawl arm e^6 , escapes the end of cross-bar c^3 , and allows the pawl to be thrown into engagement with the ratchet about the time the projection b^4 has entered the socket b^3 , and has locked the sector and set the machine for mechanical work. Another set of impulses are now given by the transmitting instrument which operates the armature lever of the magnet which imparts a rotating movement to the shaft E, and the cylinder e' ; resting upon this cylinder are a set of brushes 1, 2, 3, 4, and the operation of the device will be readily understood by looking at Figs. 4 and 5. Let us suppose the cylinder begins its movement with the brushes contacting with the cylinder as shown in Fig. 5; the current then is from the generator F, through brushes 2 and 3, back to the generator. The cylinder is turned step by step until the opposite side is reached when the brushes are all upon the conducting spaces; the current is now from the generator F, brushes 2 and 1, lamps f' , brushes 4 and 3, back to generator. The lamps are now lighted and when this occurs the armature d' is released, obtains its full stroke and throws the sector back to starting point, and this is accomplished as follows: On the shaft E, is secured a hollow bar H, to revolve with the shaft and is provided with two spring bolts h' , impelled outwardly from the center; and attached to the frame is a semi-cylindrical casing h^3 , arranged as shown in Figs. 1, 3, and 6, within which the hollow bar H with its spring bolts are turned, and confined until one of them has passed the end of said casing h^3 , when it is impelled forward by its spring striking the end of the locking-bar b' , and releasing the sector; the armature lever being free to attain its full stroke returns the sector to starting point in the manner already described. The bolt which has thus performed its work remains thrust out until it reaches the inclined plane h^4 , and is returned to its place by its own movement on this plane.

The operation of extinguishing the lamps is performed by a repetition of the same impulses, viz: a series of combination impulses to set the receiving instrument and hold it in place, then a series of impulses to perform the mechanical work in turning the cylinder, and when these are finished the other or opposite spring bolt releases the sector and the armature lever throws it back.

The cogged segment k , pinion k' and ratchet k^2 , illustrate parts of a retarding device, which may be used with a pendulum escapement, or a dash pot may be substituted or any other of the well known means for retarding may be used to steady and regulate the forward progressive movement of the sector and need not be further described.

I do not limit myself to the particular construction or operation of the parts of the instrument. For example, the transmitting in-

strument may be the ordinary telegraph key or an automatic device constructed for the purpose; or any of the combination receiving instruments may be used as well as the Hatch; a mechanic may readily substitute other specific means for locking the instrument or for releasing it, and cranks, eccentrics, worms or other mechanical instrumentalities may be introduced for performing the mechanical work, but I believe I am the first to conceive and carry out in a practical apparatus (of which I have shown and described one form) a plan for operating a receiving or selecting instrument and by means of impulses from the transmitting instrument pick out and select any one of a series of mechanical devices, and by means of the impulses subject this device to other impulses from the transmitting instrument, which actuate the mechanical devices and perform mechanical work.

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

1. The combination with an electrical impulse transmitting instrument, of a mechanical apparatus advanced into position by an impulse or impulses from said transmitter, a selecting or preparing instrument adapted to respond to a predetermined arrangement of impulses, and devices for connecting the transmitting instrument operatively with the mechanical apparatus, said devices actuated by the selecting instrument in responding to its predetermined arrangement of impulses.

2. The combination with an electrical impulse transmitting instrument, of a mechanical device advanced into position by an impulse or impulses from said transmitter, a preparing or selecting instrument having a wheel, bar, or sector provided with a representation of a predetermined arrangement of impulses, and means operated by the transmission of said predetermined arrangement of impulses to operate or control the movement of said wheel, bar, or sector, and devices operated by said wheel, bar or sector, in responding to its predetermined arrangement of impulses, to connect the transmitting instrument operatively with the mechanical apparatus.

3. The combination with an electrical impulse transmitting instrument, of a mechanical apparatus advanced into position by an impulse or impulses from said transmitter, a selecting or preparing instrument responding to a predetermined arrangement of electrical impulses and thereby connecting the transmitting instrument operatively with the mechanical apparatus.

4. The combination with an electrical impulse transmitting instrument of a mechanical apparatus having two or more phases of operation, and mechanism to advance the same into phase position alternately in response to an impulse or impulses from said transmitter, a selecting or preparing instrument provided with means responding to a

predetermined arrangement of electrical impulses from said transmitter, devices operated thereby to bring the mechanical apparatus and the transmitting instrument into responsive co-operation, devices responding to an additional impulse or impulses from said transmitting instrument to actuate the advancing mechanism of the mechanical device to one of its phase positions, and means responding to a repetition of said impulse or impulses to actuate said advancing mechanism to produce an alternate phase.

5. The combination with an electrical impulse transmitting instrument of a mechanical apparatus having two or more phases of operation, and mechanism to advance the same into phase position alternately in response to an impulse or impulses from said transmitter, a selecting or preparing instrument provided with means responding to a predetermined arrangement of electrical impulses from said transmitter, devices operated thereby to bring the mechanical apparatus and the transmitting instrument into responsive co-operation, devices responding to an additional impulse or impulses from said transmitting instrument to actuate the advancing mechanism of the mechanical device to one of its phase positions, and means for restoring the selecting instrument to its starting point operated by an impulse or impulses from said transmitter.

6. In an electric selecting apparatus an impulse transmitting instrument in circuit with an impulse receiving instrument adapted to respond to a fixed combination of electrical impulses to complete its phase, in combination with locking means responding to the transmitted impulses to lock the receiving instrument when its phase is completed and a spring bolt for unlocking the receiving instrument when required.

7. The combination with an electrical impulse transmitting instrument, of a mechanical device operated by an impulse or impulses from said transmitter, a selecting or preparing instrument adapted to respond to a predetermined arrangement of impulses to complete its phase, means operated by said selecting instrument in responding to its predetermined arrangement of impulses to thereby bring the mechanical device into responsive co operation with the transmitting instru-

ment, means responding to an additional impulse or impulses from said transmitter to operate the mechanical device after the phase of the selecting instrument is completed, locking devices operated by said selecting instrument to hold said instrument until the mechanical work is completed, and means responding to an impulse or impulses from said transmitting instrument to unlock the selecting instrument and restore it to its starting point.

8. The combination with an electrical impulse transmitting instrument of a mechanical device operated by a series of impulses from said transmitter, a selecting or preparing instrument having a wheel, bar or sector provided with a mechanical representation of a predetermined arrangement of electrical impulses, means operated by the selecting instrument in responding to its predetermined arrangement of impulses to thereby bring the mechanical device and the transmitting instrument into responsive co-operation, and a single magnet responding to said transmitting instrument to operate or control the selecting instrument and actuate the mechanical device.

9. In an electric selecting system, the combination with an electrical impulse transmitting instrument, of a number of mechanical devices each of them having one or more phases of operation and advanced into phase position by an impulse or impulses from said transmitter, a selecting or preparing instrument arranged in connection with each of said mechanical devices and each of said selecting instruments adapted to respond to a predetermined arrangement of impulses and to no other, means operated by each of said selecting instruments in response to its own predetermined arrangement of impulses to thereby bring the mechanical device with which it is connected and no other into responsive co-operation with the transmitting instrument.

Signed at Cincinnati, in the county of Hamilton and State of Ohio, this 30th day of June, A. D. 1891.

ROBB MACKIE.

Witnesses:

J. D. MEEKER,

LOUIS A. BROWNBECK.