(No Model.) 4 Sheets—Sheet 1.

H. S. PRENTISS.

ELECTRIC TRANSMITTING CLOCK.

No. 452,955. Patented May 26, 1891.

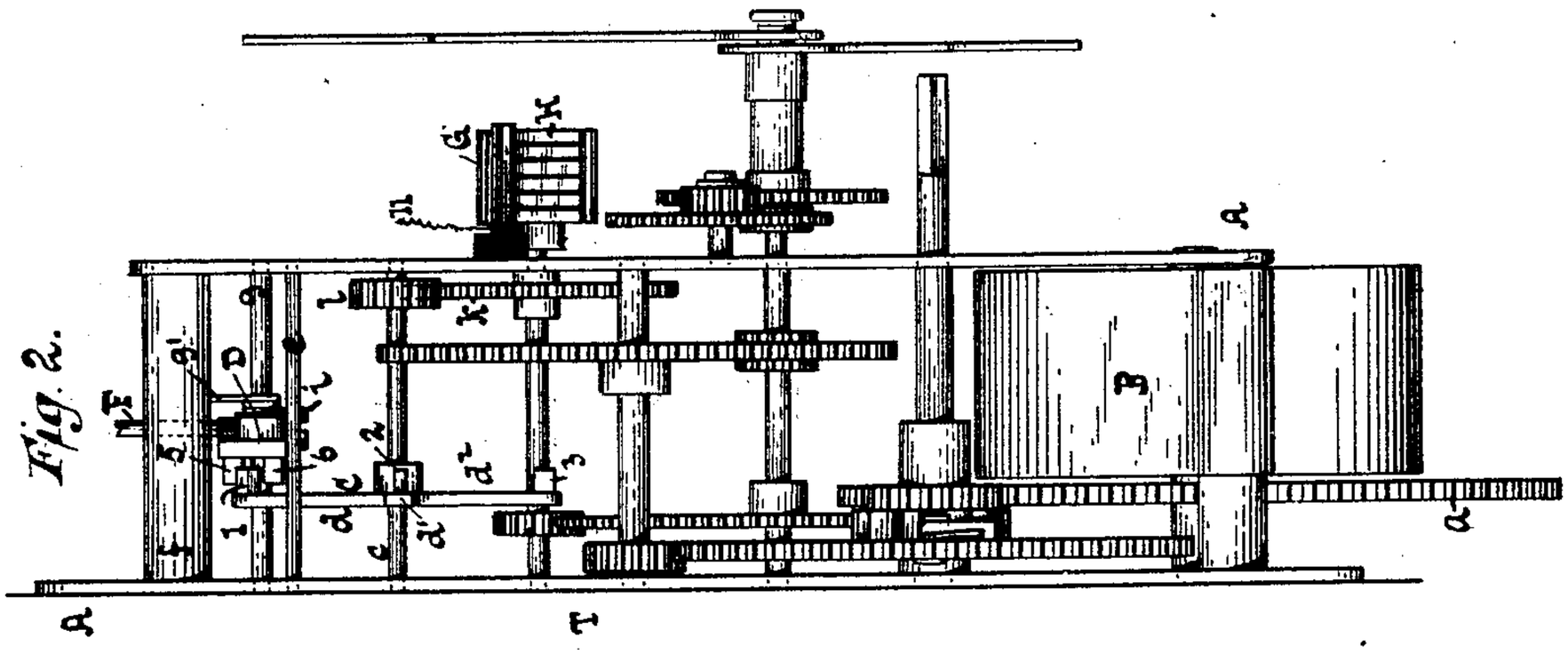


Fig. 2.

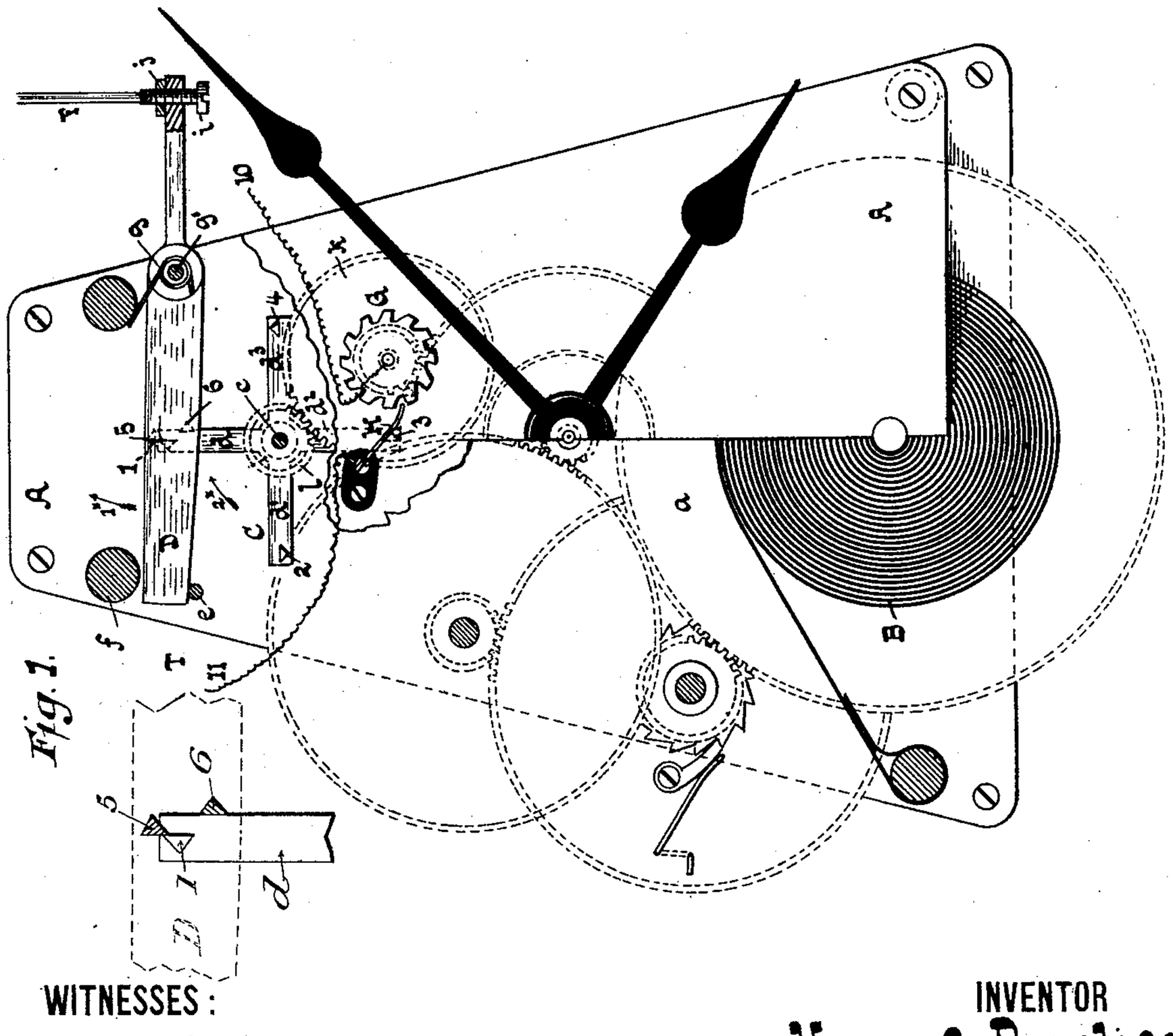


Fig. 1.

WITNESSES:

Geo. Wadmond
A. Faber du Faur

INVENTOR

BY Henry S. Prentiss
A. Faber du Faur Jr.
his ATTORNEY

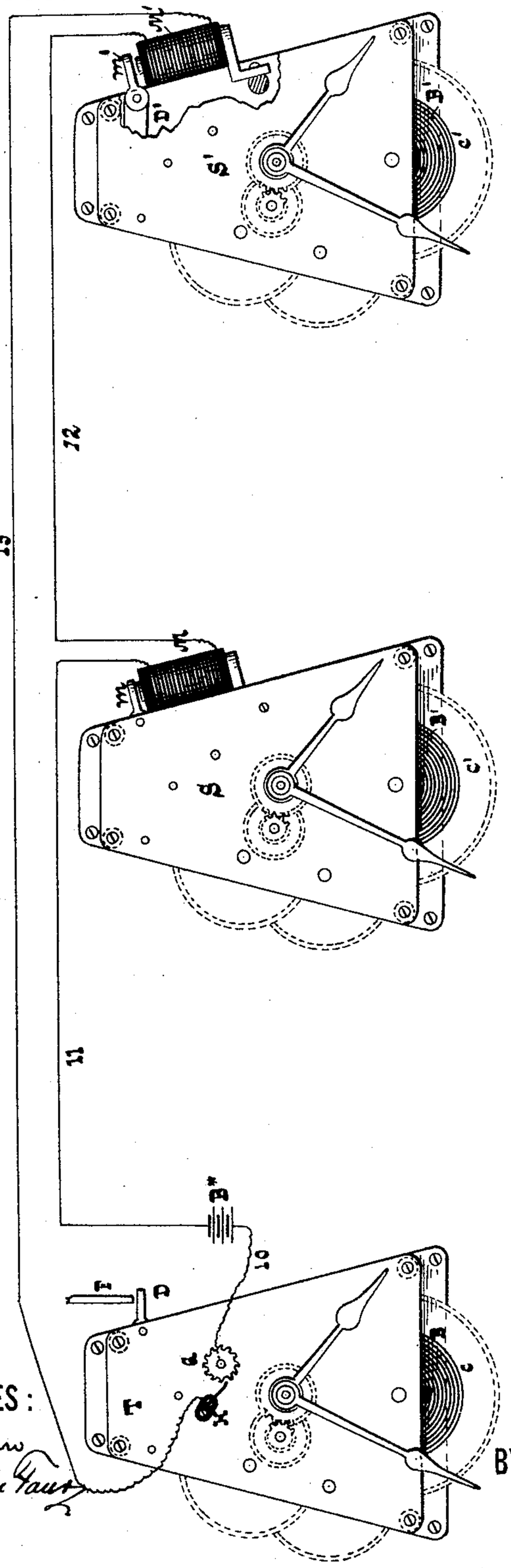
(No Model.) 4 Sheets—Sheet 2.

H. S. PRENTISS.

ELECTRIC TRANSMITTING CLOCK.

No. 452,955. Patented May 26, 1891.

Fig. 3.



WITNESSES:

Geo. Wadman

A. Faber du Faur

INVENTOR

BY Henry S. Prentiss.

A. Faber du Faur.

ATTORNEY

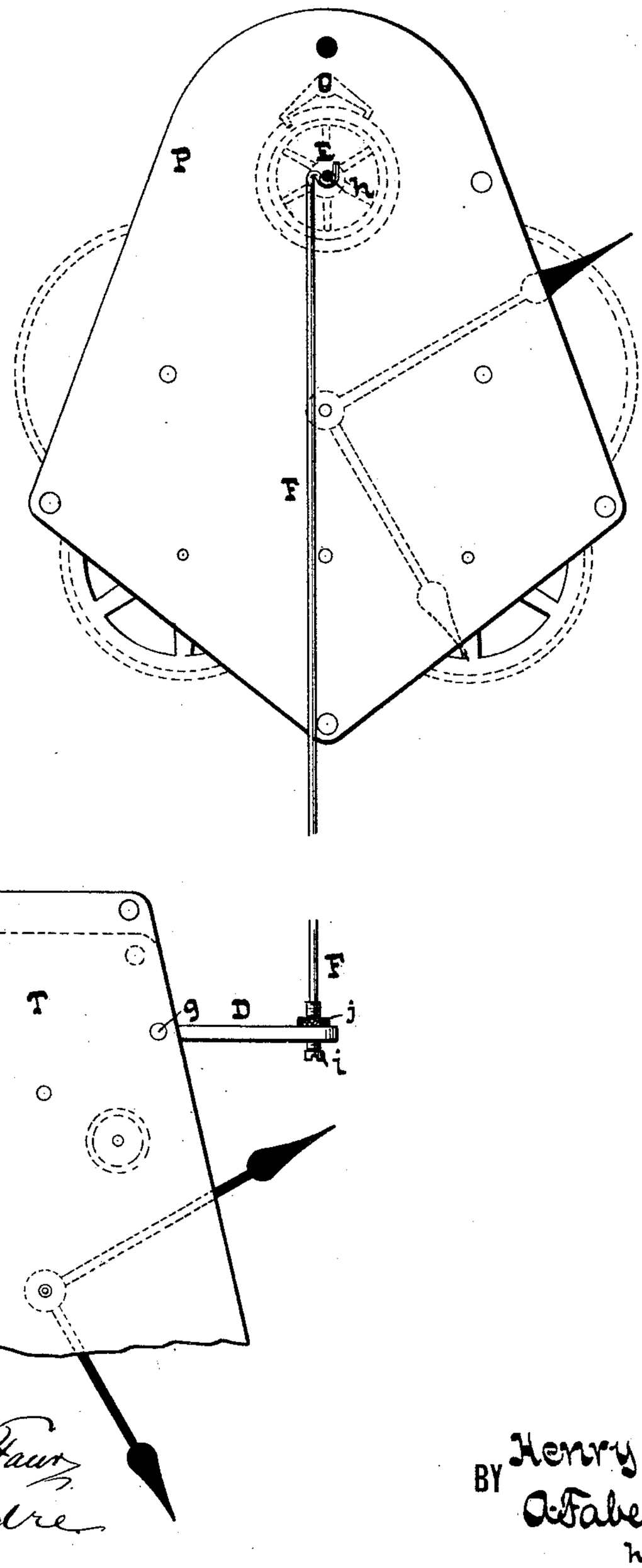
(No Model.) 4 Sheets—Sheet 3.

H. S. PRENTISS.

ELECTRIC TRANSMITTING CLOCK.

No. 452,955. Patented May 26, 1891.

Fig. 4.



WITNESSES:
A. Faber du Faur
L. N. Legendre

INVENTOR
Henry S. Prentiss.
BY A. Faber du Faur
his ATTORNEY

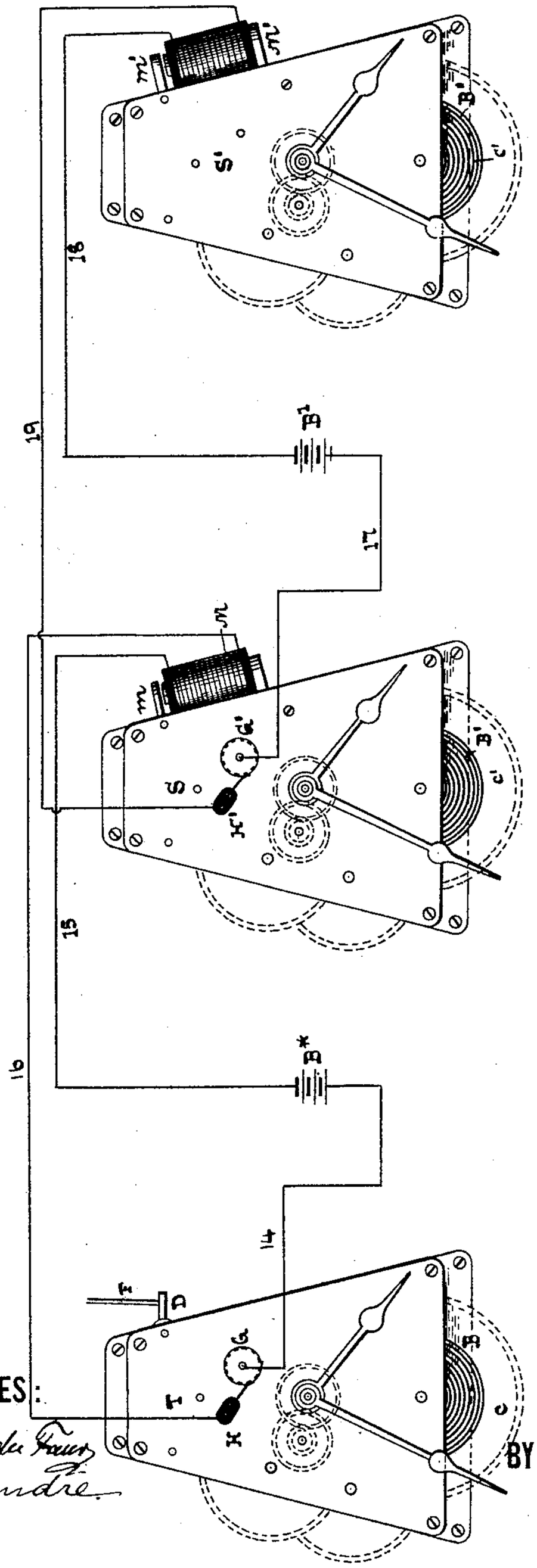
(No Model.) 4 Sheets—Sheet 4.

H. S. PRENTISS.

ELECTRIC TRANSMITTING CLOCK.

No. 452,955. Patented May 26, 1891.

Fig. 5.



WITNESSES:

A. Faber du Faur

L. N. Legendre.

INVENTOR

Henry S. Prentiss.

BY Faber du Faur

his ATTORNEY

UNITED STATES PATENT OFFICE.

HENRY S. PRENTISS, OF ELIZABETH, NEW JERSEY.

ELECTRIC TRANSMITTING-CLOCK.

SPECIFICATION forming part of Letters Patent No. 452,955, dated May 26, 1891.

Application filed June 6, 1890. Serial No. 354,447. (No model.)

To all whom it may concern:

Be it known that I, HENRY S. PRENTISS, a citizen of the United States, and a resident of Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Electro-Mechanical Clocks, of which the following is a specification.

My invention has reference to improvements in electro-mechanical clocks and to the connections of the primary or master clock with the transmitter, as fully pointed out in the following specification and claims and illustrated in the accompanying drawings, in which—

Figure 1 represents an elevation of a transmitter constructed according to my invention. Fig. 2 is a side view of the same. Fig. 3 is an elevation on a smaller scale than the preceding figures, illustrating the clocks arranged in series. Fig. 4 illustrates the connection between the primary or master clock and the transmitter. Fig. 5 is an elevation on the same scale as Fig. 3, illustrating the clocks arranged according to the relay system.

Similar letters and figures indicate corresponding parts.

In the drawings, referring at present to Figs. 1 and 2, the letter A designates the frame of the transmitter T, said frame being provided with bearings for the several parts of a train constituting a usual form of clock-movement, of which B is the mainspring and *a* the first or great wheel. The first wheel is ultimately connected through the train with a pinion *l*, rigidly mounted upon an arbor *c*, upon which latter is secured to turn therewith a scape-wheel C, formed with a number of radial arms *d*, *d'*, d^2, and d^3, provided near their outer terminals with teeth 1, 2, 3, and 4. These teeth are adapted to be successively engaged in the rotation of the scape-wheel by the pallets 5 and 6 of a pallet-lever D, arranged to vibrate about a pivot *g*, the motion of said pallet-lever being limited in either direction by contact with suitable stops, such as *e* and *f*. The pallets 5 and 6 of the pallet-lever, it will be noticed, are arranged in different vertical and horizontal planes.

Referring to Fig. 1, the pallet-lever is normally held against the stop *e* by the pressure of a spring *g'*, in which position of the pallet-lever the upper pallet 5 thereon is in the proper plane to cross the path of the teeth on the scape-wheel and to prevent the rotation of the latter by engagement with the upper portion of one of its teeth, say tooth 1. Consequently the train is held out of action. If now the pallet-lever is turned about its pivot in the direction of arrow 1*, Fig. 1, tooth 1 is released from pallet 5 and the scape-wheel can turn in the direction of arrow 2*. The pallet-lever now being against stop *f*, the pallet 6 thereon is in the proper plane to engage with the lower edge of tooth 1. Consequently the scape-wheel at this stage rotates only through a very small arc, corresponding to the distance between the two pallets 5 and 6, when its motion is arrested by the pallet 6. The pallet-lever now returning to its normal position against stop *e*, pallet 6 releases tooth 1, and the scape-wheel completes a quarter of a revolution, whereupon its motion is arrested by the engagement of its tooth 2 with pallet 5 of the pallet-lever. The proportions of the train in this example are such that for each quarter of a revolution of the scape-wheel the hands move over a space on the dial corresponding to one minute of time. It is evident that the same result can be accomplished by providing each of the arms of the scape-wheel with two teeth, arranged similarly to those on the pallet-lever and providing the pallet-lever with but one pallet.

The release of the transmitter-movement can be effected by various means; but I prefer to make use of positive mechanical means, such as illustrated in Fig. 4 of the drawings, in which P represents the primary or master clock, which may embody any well-known accurate movement. E is the scape-wheel arbor thereof or other rotary part; F, a rod or bar, which is engaged by a cam or eccentric *h* on said arbor and has its lower end in connection with the pallet-lever of the transmitter T. In Fig. 1 I have shown the lower end of the rod F resting in a socket, formed in a screw *i*, capable of being locked after proper adjustment by a nut *j*.

In place of having a master-clock independent of the transmitter it is evident that the transmitter could embody a train having an

intermittent motor—such, for instance, as the clock described in Letters Patent No. 416,804, granted to me December 10, 1889—whereby the intermittent motion at proper intervals would be imparted to the circuit-closer. The circuit-closer may consist of any well-known combination of devices—such for instance, as the contact-wheel G and the brush H. The wheel G is connected by gears *k* and *l* with the arbor *c* of the scape-wheel C of the transmitter. Consequently it participates in the intermittent motion of the said arbor. The brush H is insulated from the frame of the transmitter. The gears *k* and *l* are so proportioned that the contact is closed once for each quarter of a revolution of the scape-wheel C—that is to say, once every minute.

The secondary clock S is constructed similarly to the transmitter as far as the train and escapement devices are concerned, with the exception that the pallet-lever D is provided with an armature *m*, in juxtaposition with which are arranged suitable electro-magnets M, which attract said armature whenever the circuit is closed by the transmitter T and release it when the circuit is broken to momentarily release the train. The circuit-closer G H may be omitted when the clocks are arranged in series, as in Fig. 3, or in the parallel or multiple arc system; but are retained when the clocks are arranged according to the relay system, as illustrated in Fig. 5.

In Fig. 3, B* represents the battery or other generator of electricity, one pole of which is connected by wire 10 with the wheel G of the circuit-closer on the transmitter, and from the other pole a wire 11 is led to connect with one end of the coil of electro-magnet M of the secondary clock S. The opposite end of the coil is connected by wire 12 with one end of the coil of electro-magnet M′ of secondary clock S^2, the other end of said coil being connected by wire 13 with the brush H of the circuit-closer on transmitter T.

In Fig. 5 I have shown the clocks arranged according to the relay system, B* and B′ representing the batteries, T the transmitter, and S and S′ the respective secondary clocks. In this case the secondary clocks, with the exception of the terminal clock, are each provided with a circuit-closer, as G′ H′, similar in construction and arrangement to that of the transmitter. When the circuit is momentarily closed by the circuit-closer G H of the transmitter, the current passes from the battery B* through wire 14, wheel G, contact-brush H, wire 16, through coils of electro-magnet M of secondary clock S, over wire 15, and back to the battery and vitalizes the electro-magnet M. The train of the secondary clock S being momentarily released, as heretofore described, when the circuit is broken at circuit-closer G H, its circuit-closer now closes the circuit of battery B′, and the current now passes, through wire 17, wheel G′, brush H′, wire 19 to the coils of electro-magnet M′, and wire 18, back to the battery, thereby vitalizing the electro-magnet of the secondary clock S′ to effect the release of its train when the circuit is broken at contact-closer G′ H′.

It is evident that from the terminal clock in the relay system a secondary series of clocks, such as shown in Fig. 3, may be operated, said clock then serving as a transmitter.

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

1. In an electric-clock system, the combination of a transmitter, its escapement-wheel and pallet-lever, a primary clock provided with a cam or eccentric, a rod connecting the pallet-lever of the transmitter with the eccentric of the primary clock, means for adjustment between the rod and the pallet-lever, a series of secondary clocks, a generator of electricity, and electrical connections, substantially as described.

2. In combination with a transmitter, its escapement-wheel and pallet-lever, a primary clock provided with a cam or eccentric, a rod connecting the pallet-lever of the transmitter with the eccentric of the primary clock, and means for adjustment between the rod and the pallet-lever, substantially as described.

3. In an electric-clock system, a series of secondary clocks provided with circuit-closers actuated by the respective trains, a generator of electricity, a series of relay-batteries, and electrical connections, whereby one clock closes the circuit through the next succeeding clock, substantially as described.

4. In an electric-clock system, a transmitter provided with a circuit-closer, a primary clock having one of its moving parts in operative mechanical connection with the pallet-lever of the transmitter, a series of secondary clocks provided with circuit-closers, a generator of electricity, a series of relay-batteries, and electrical connections, substantially as described.

5. In an electro-mechanical clock, a scape-wheel, a spring-pressed pallet-lever engaging the same and playing between suitable stops, and means for vibrating the pallet-lever, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 26th day of May, 1890.

HENRY S. PRENTISS.

Witnesses
A. FABER DU FAUR,
L. N. LEGENDRE.