

(No Model.)

F. SARGENT.

2 Sheets—Sheet 1.

ELECTRIC TRAIN SIGNAL.

No. 440,508.

Patented Nov. 11, 1890.

Fig. 1.

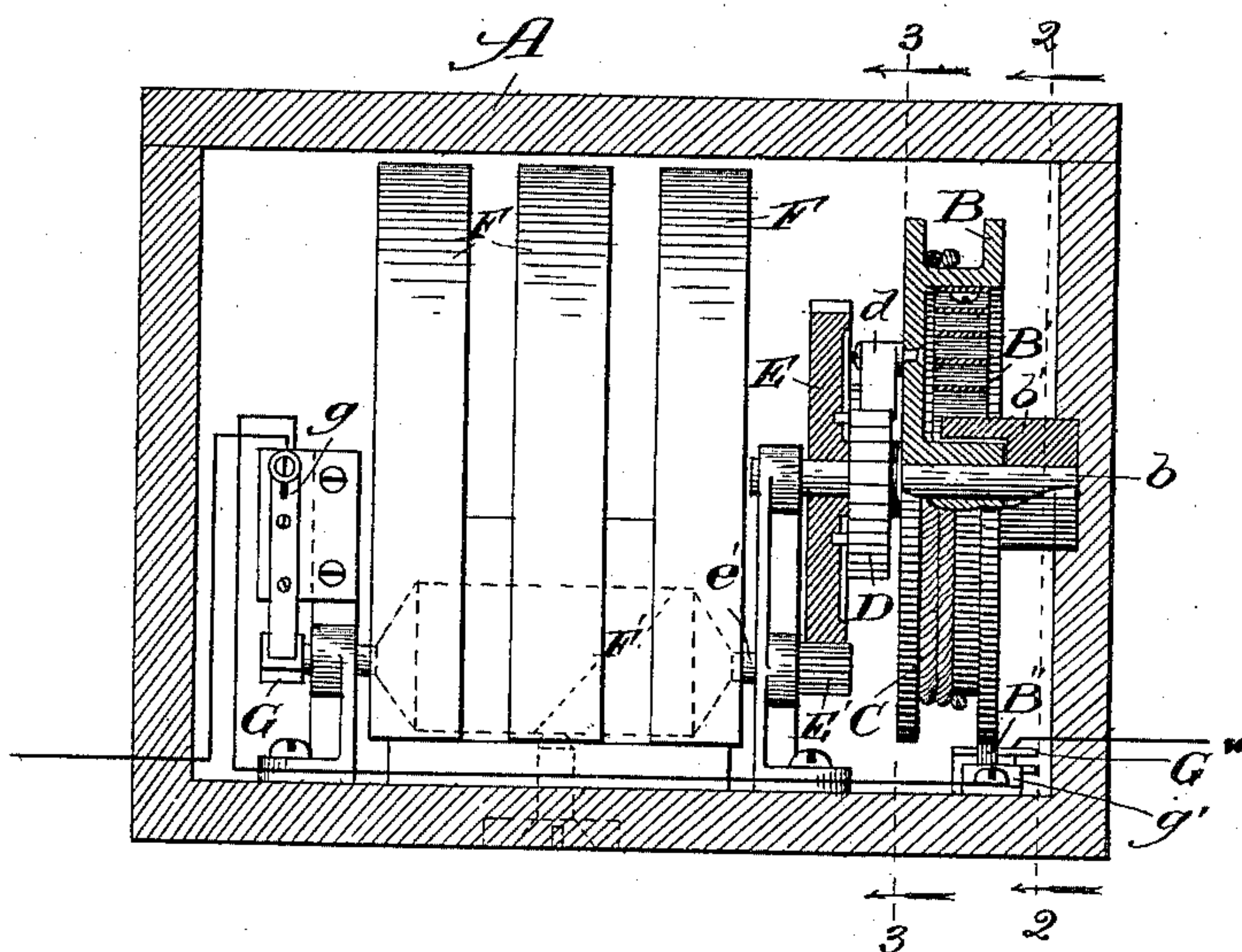


Fig. 2.

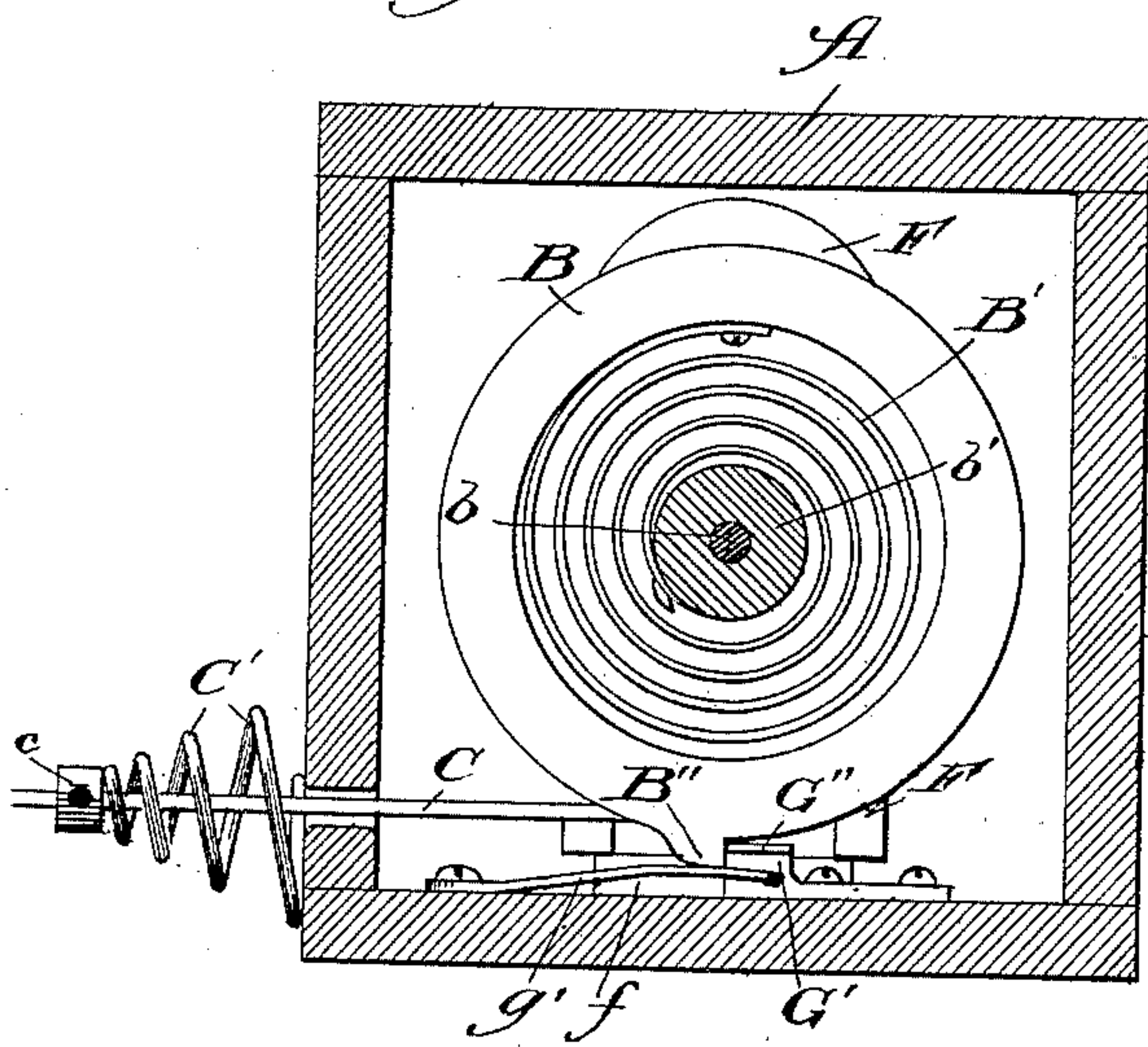
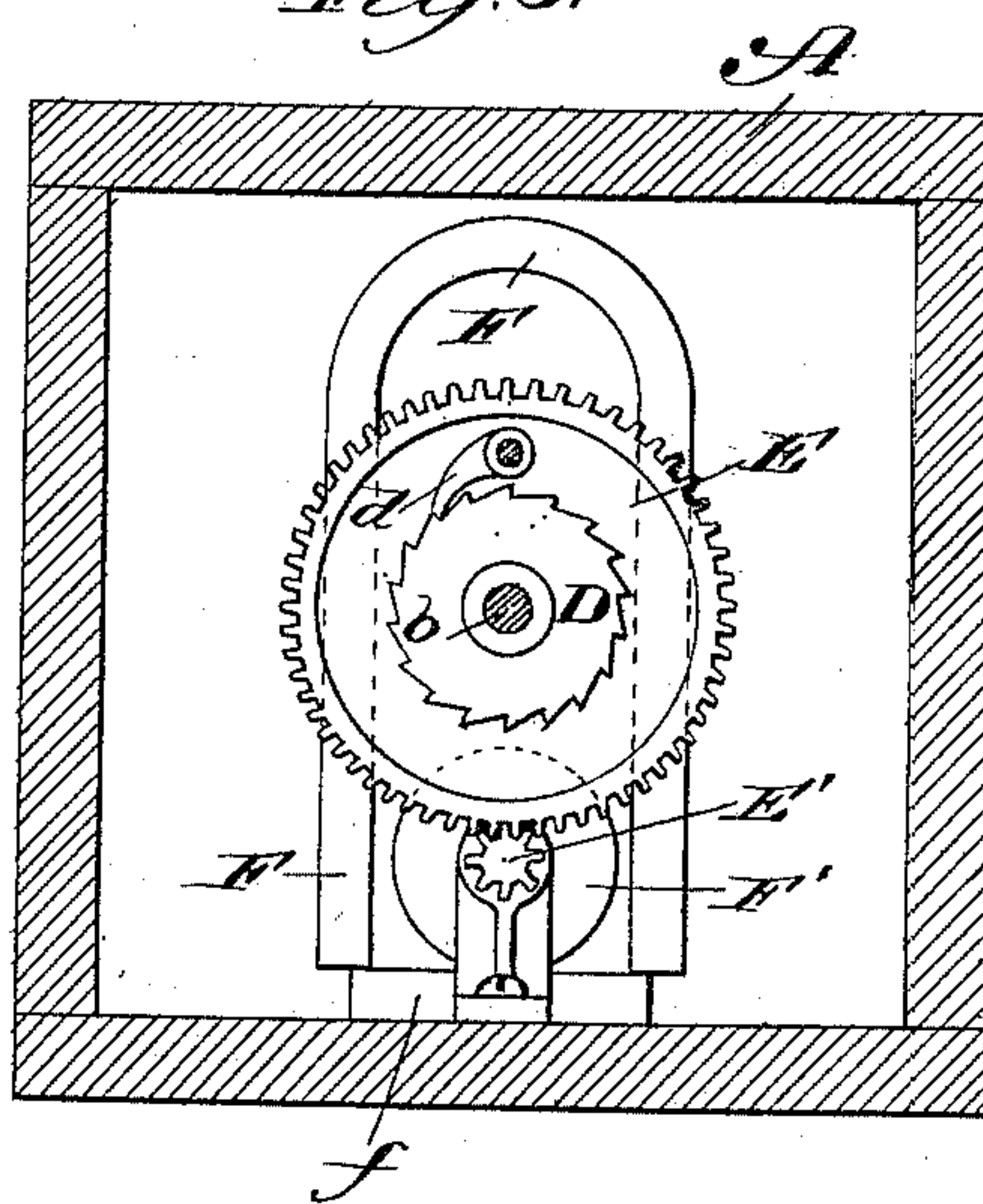


Fig. 3.



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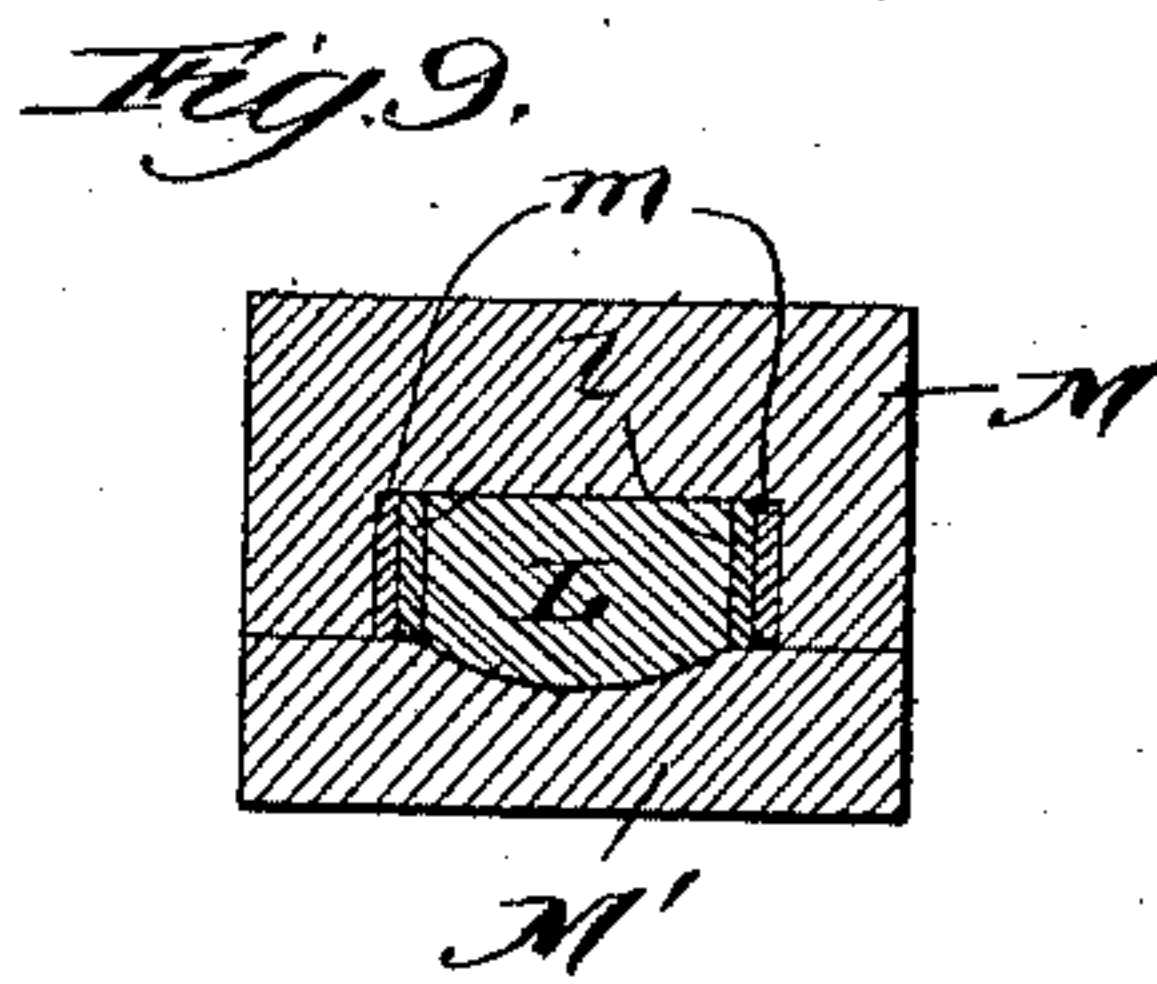
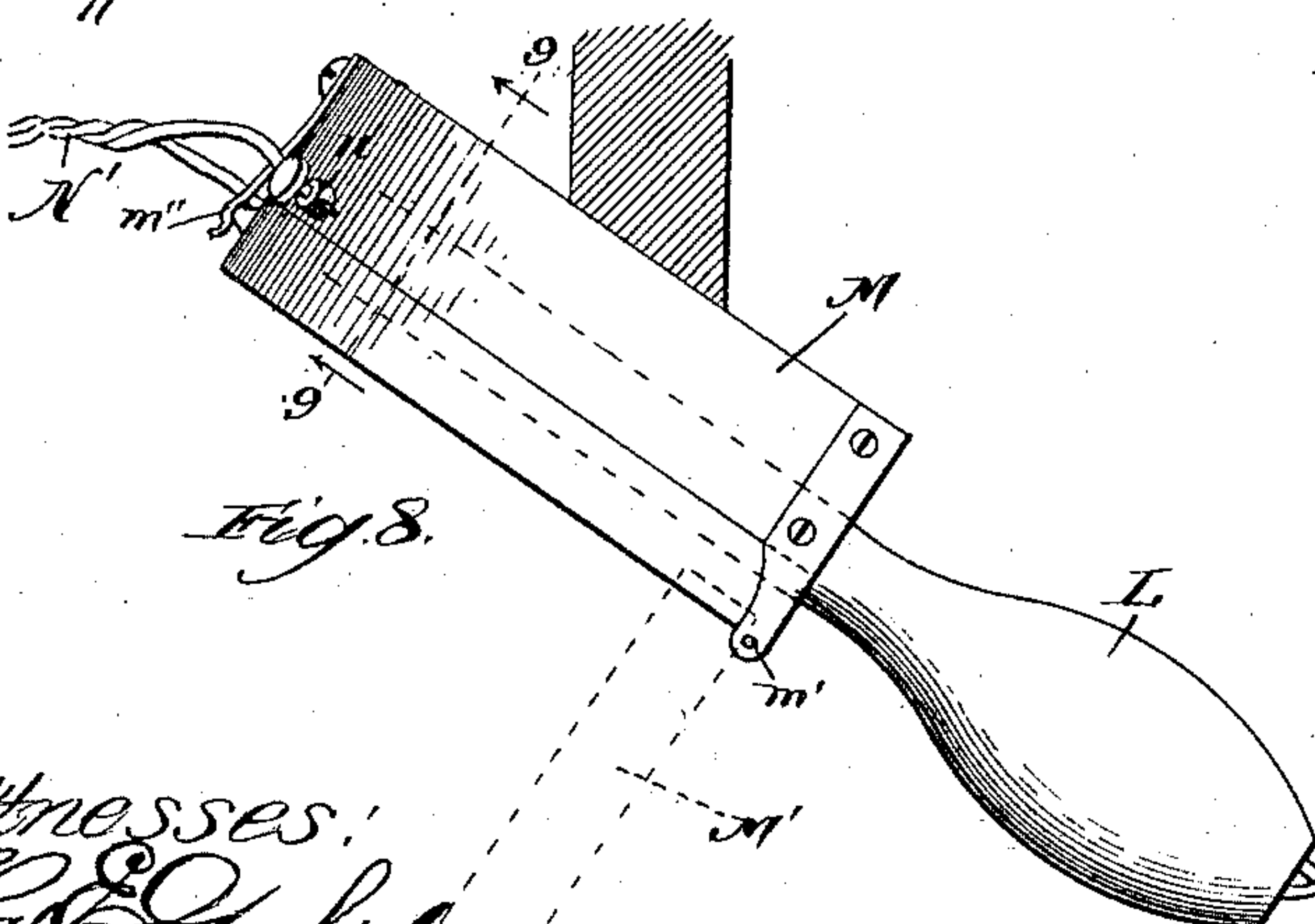
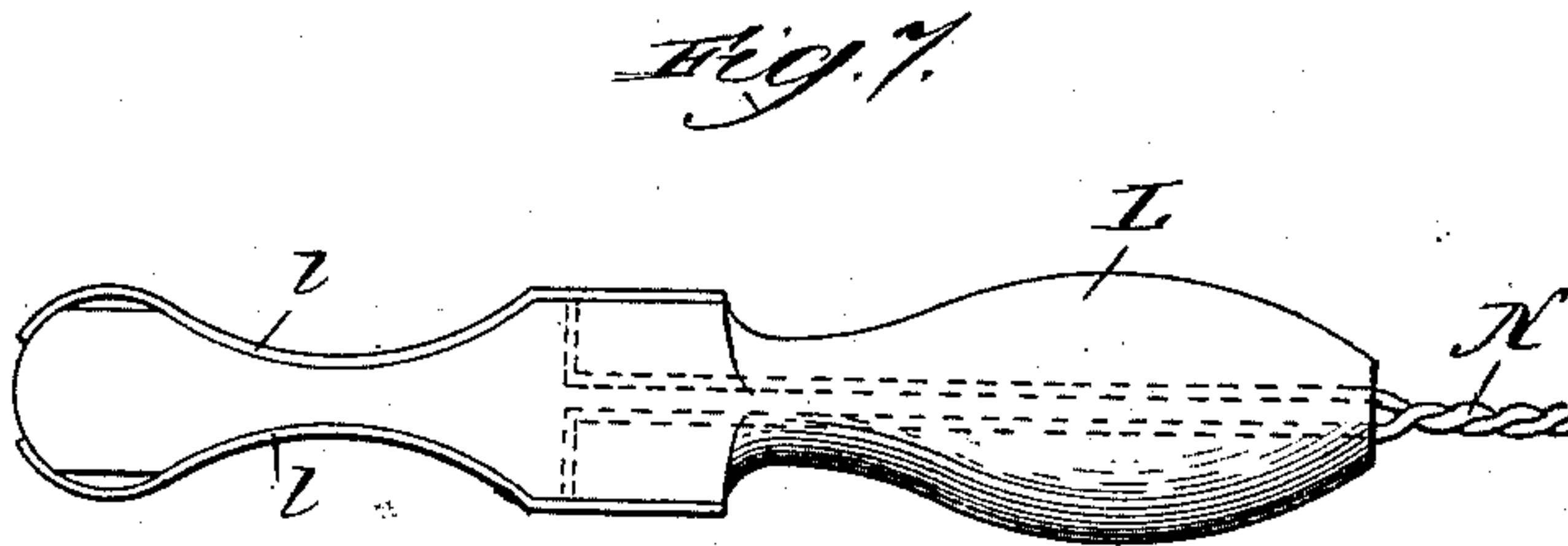
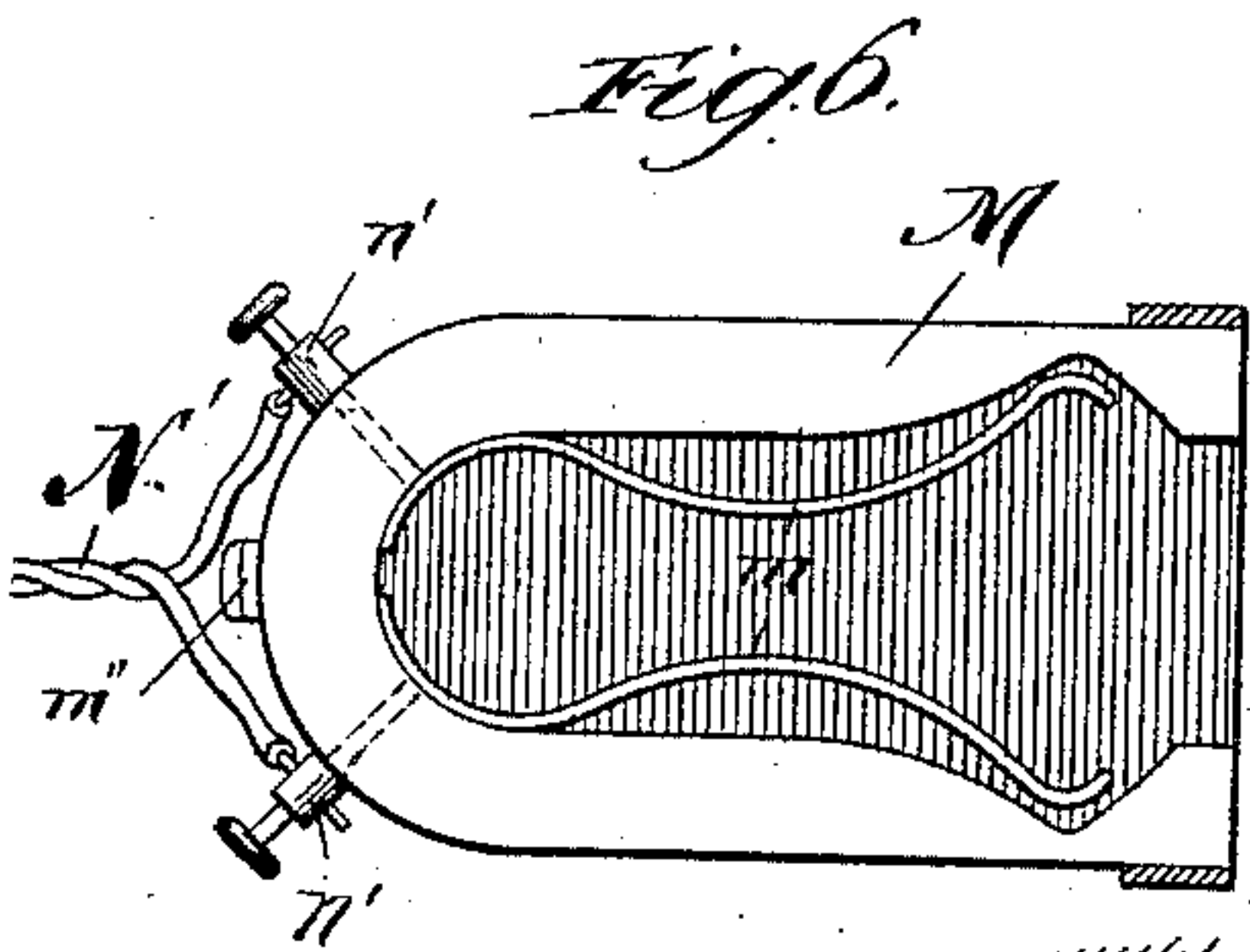
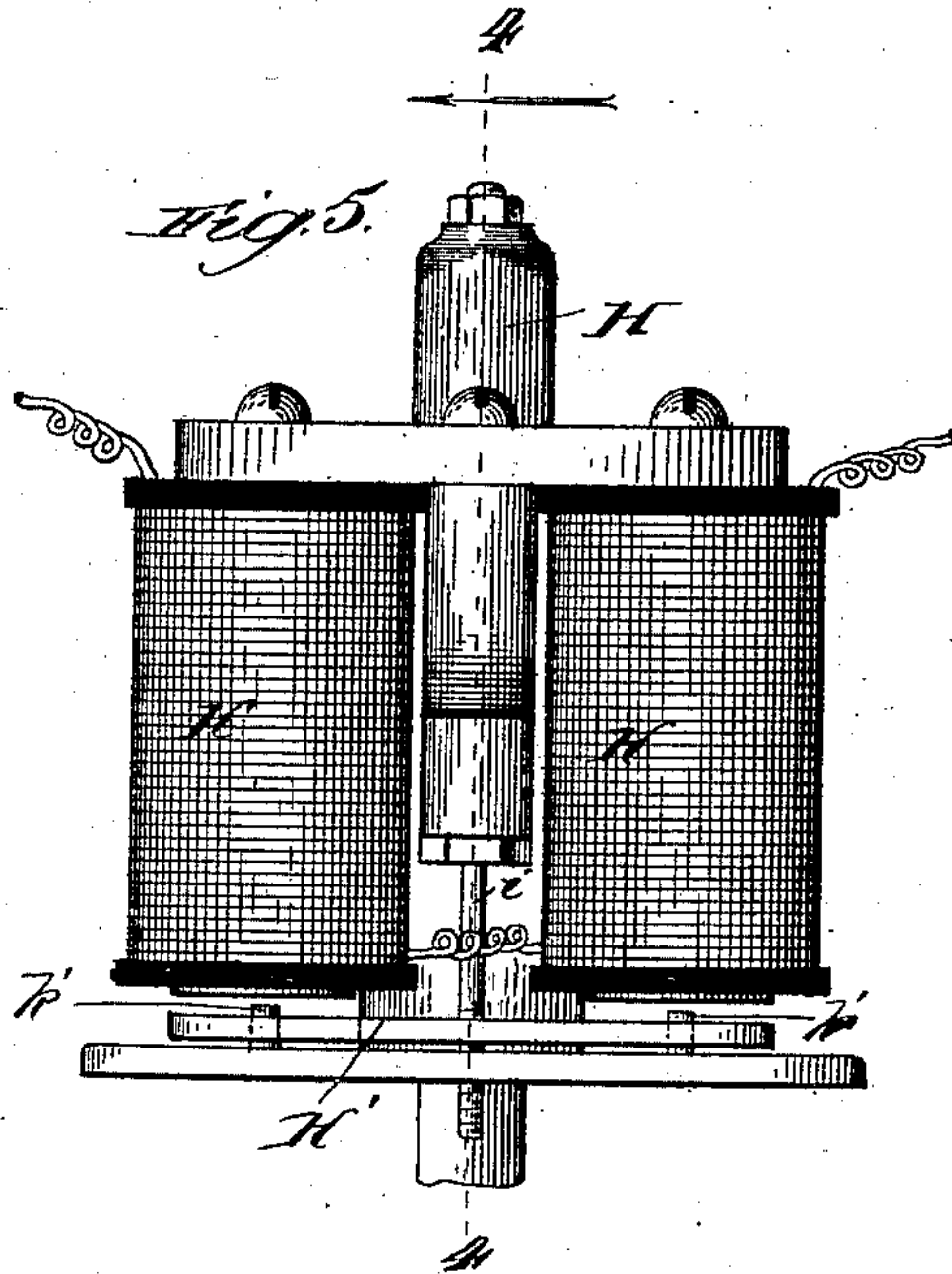
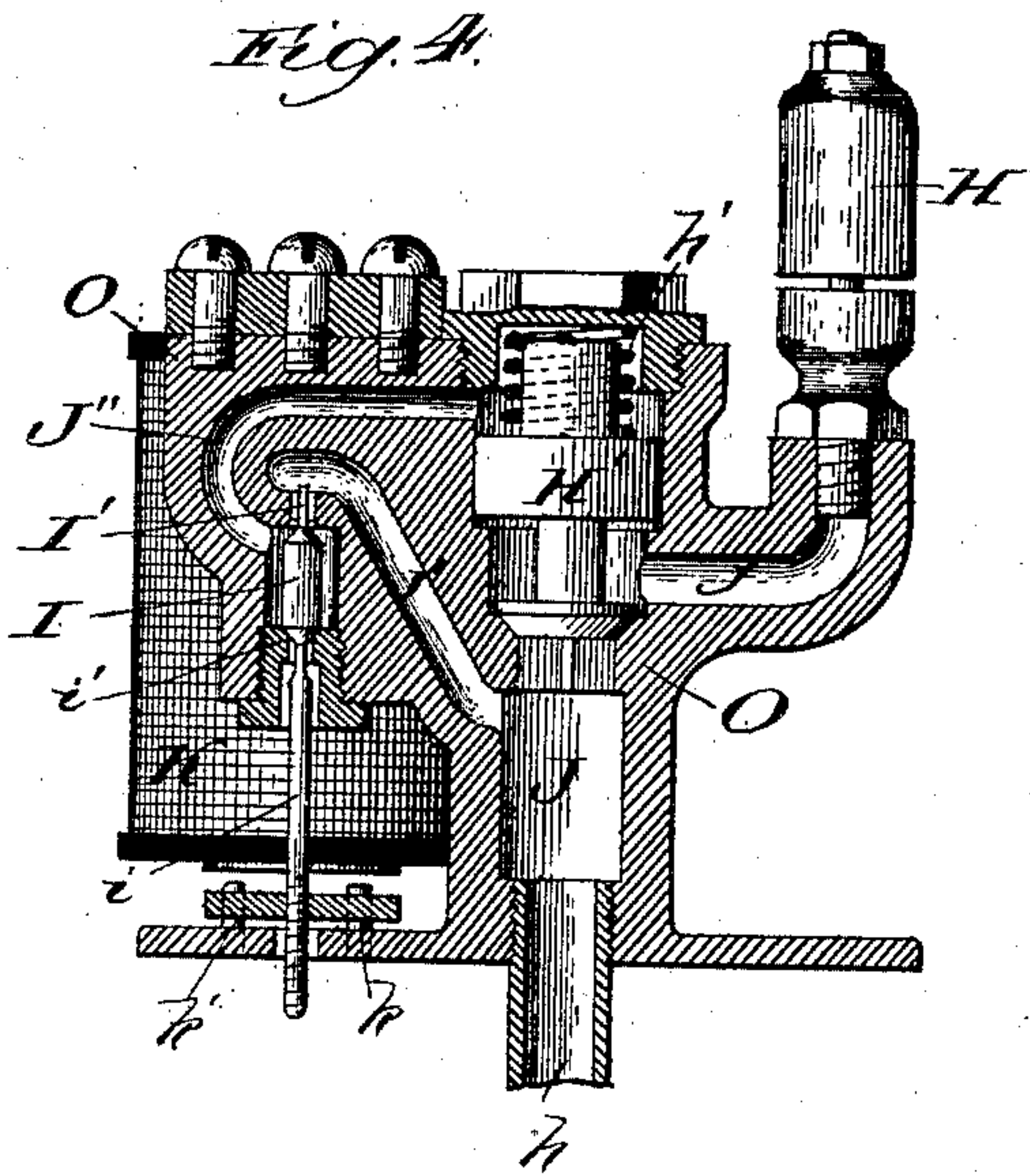
(No Model.)

2 Sheets—Sheet 2.

F. SARGENT.
ELECTRIC TRAIN SIGNAL.

No. 440,508.

Patented Nov. 11, 1890.



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UNITED STATES PATENT OFFICE.

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ELECTRIC TRAIN-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 440,508, dated November 11, 1890.

Application filed May 6, 1890. Serial No. 350,751. (No model.)

To all whom it may concern:

Be it known that I, FITZWILLIAM SARGENT, a citizen of the United States, residing at Aurora, Kane county, Illinois, have invented certain new and useful Improvements in Electric Train-Signals, of which the following is a specification.

The object of this invention is to provide an improved electric train-signal, as hereinafter more fully described, comprising, speaking generally, a whistle located on the engine suitably connected to a reservoir of air or steam, the operating-valves thereof being controlled by a suitable electro-magnet, the arrangement of the parts being such that the whistle is blown whenever an electric current passes through the circuit, ceasing to sound upon the cessation of such current, the parts being also preferably so arranged with only that magneto-generator which is used for the purpose of sending the signal in the electro-magnetic circuit at that time and out of such circuit at all other times; and the invention consists in the features and details of construction hereinafter described and claimed.

In the drawings, Figure 1 is a vertical central longitudinal section of the magneto-generator; Figs. 2 and 3, vertical cross-sections on lines 2 2 and 3 3 of Fig. 1, respectively, looking in the direction of the arrows; Fig. 4, a vertical central section of the whistle and its valves, taken on the line 4 4 of Fig. 5, looking in the direction of the arrows; Fig. 5, an elevation of the whistle and operating-magnets. Figs. 6 to 9 are views illustrating the form of coupler employed, Fig. 6 showing the coupler-box with its bottom removed, Fig. 7 the other part of the coupler or plug, Fig. 8 an elevation representing the parts coupled together, the position of the bottom of the box when open being indicated by dotted lines, and Fig. 9 a cross-section of the coupler on the line 9 9 of Fig. 8, looking in the direction of the arrows.

A is a box or case containing the magneto-generator; B, a drum mounted on a shaft *b*; B', a helical spring; B'', a lug on the drum B; C, the signal-cord; *c*, a stop on such cord; C', a volute spring; D, a ratchet mounted on the shaft *b*; *d*, a pawl; E, a gear-wheel mounted on the shaft *b*; E', a similar gear-wheel mounted on the shaft *e'*; F F F, magnets; F',

the armature mounted on the shaft *e'*; G, the commutator; *g*, the brushes; G', a stop; *g'*, a spring; G'', a contact-point; H, a whistle; *h*, a supply-pipe leading thereto; H', a puppet-valve; *h'*, a spring; I, a double valve; *i*, the stem thereof; I', the induction-port; *i'*, the eduction-port; J *j* J' J'', passages leading to and from the valves; K K, electro-magnets; K', the armature thereof; L, a plug; M, a box; M', the bottom of such box; *l m*, contact-strips; N N', conducting wires or cables; *n' n'*, binding-posts.

In constructing the magneto-generator part of this apparatus the drum B is made of any suitable size and material and preferably of the shape shown in the drawings, wherein it is provided with a circumferential groove in which is wound the signal-cord C, as shown in Figs. 1 and 2, this cord being attached at one end to the drum and passing thence into the car, being located in any convenient and easily-accessible position. This drum B is mounted upon a shaft *b*, supported in suitable bearings in a box or case A, in which all of the parts of the generator are preferably inclosed. A flat helical spring B', similar to the mainspring of a watch, is fastened to the drum B at one end and at the other to a casting *b'*, attached to the case A.

On the shaft *b* is mounted a ratchet-wheel D, and to the drum is fastened a pawl *d*, adapted to engage with the teeth on the ratchet to turn the same when the drum B is revolved from right to left, Figs. 2 and 3. The ratchet-wheel D engages, as shown, with a cog E, also mounted upon the shaft *b*, and this cog meshes with another cog E', mounted upon the shaft *e'*.

Suitable horseshoe-magnets F are provided, resting upon a support *f*. I prefer to use three of these magnets, but any other suitable number may be employed, as desired. Between these is placed the armature F', mounted upon the shaft *e'*. To the other end of this shaft is secured the commutator G, the brushes *g* being attached to a suitable support, as shown in Fig. 1. Suitable electric connections are provided leading off from the brushes of the commutator.

At a suitable point upon the drum B is a lug B'', which in the normal position of the parts is held against a stop G' by the tension

of the spring B'. To the bottom of the case A is attached a spring g' , and the stop G' supports a contact-point G''. In the position shown in Fig. 2 the lug B'' depresses the spring g' , keeping it out of contact with the point G''.

In connection with the cord C is a volute spring C', Fig. 2, for the purpose of keeping the cord around the driving-drum taut, so that it cannot slip off and by jamming prevent the drum from rotating. This is accomplished by means of a stop c upon the cord, which is adjusted so that it comes into contact with the spring just before the lug on the drum strikes against the stop G', thus putting a slight tension on the spring and keeping the cord taut.

In Figs. 4 and 5 I have shown the construction of the whistle, together with its operating mechanism. A suitable casting or framework O is provided, preferably of the shape shown in the drawings. In this are cast, drilled, or otherwise formed passages J, j , J', J'' of any suitable size and preferably in the relative position shown. At the upper end of the passage j is attached a whistle H. The whistle and operating mechanism are placed in the cab of the locomotive, or in any other position that will allow the engineer to hear the whistle when blown. I then construct a puppet-valve H', which closes the port in the upper end of the passage J, which connects with the supply-pipe h , leading to any suitable source of steam or air supply, as the steam-dome of the locomotive or the air-reservoir. The face of the puppet-valve opposite the supply-pipe has a larger surface than that closing the port, and bearing against this larger face is a spiral spring h' , the object of which is to aid in the quick seating of the valve. I also provide a double-faced valve I, adapted to close either one of two ports I' i' , which I call, respectively, the "induction" and the "eduction" port. The induction-port connects with the passage J by means of a passage J', and the eduction-port connects with the open air, as shown. From the chamber in which the valve I is placed a passage J'' leads to the space above the upper face of the puppet-valve H'. In its normal position the auxiliary valve I is seated at the eduction-port. Hence the induction-port is open. With the valve in this position when air or steam under pressure is admitted to the supply-pipe it passes through the passages J' J'' and holds the valve H' seated through the excess of pressure on its upper face, thus shutting off the air from the whistle. When the auxiliary valve is seated at the induction-port, the passage J' is closed, the eduction-port being open, allowing the air to escape from the space at the upper end of the puppet-valve through the passage J''. The pressure of the air in the passage J raises the valve H and blows the whistle.

Attached to the frame O are a pair of electro-magnets K, provided with a suitable ar-

mature K', moving up and down on studs or pins k' , as shown in Figs. 4 and 5, and to this armature is secured in any suitable manner the stem i of the valve I.

In Figs. 6 to 9 is illustrated the preferred form of coupler used for joining the cars and engine in the electro-magnet circuit. The coupler consists of a plug L of any suitable size and material. This plug is provided with two contact-springs l , and the conducting-cable N passes in at one end of the plug and is connected, as shown in Fig. 7, with these springs. The other part of the coupler consists of a box M, provided with contact-springs m , connected by means of suitable binding-posts n' with the conducting-cord N'. When the parts are put together, the strips l contact with the strips m , establishing the circuit from car to car. As shown in Fig. 8, the box M is attached to the car at an angle and the bottom M' thereof is hinged at m' and fastened by means of a spring-clip m'' . If a comparatively slight strain is put upon the plug in the direction of the arrow, as when adjoining cars are separated from any cause, the plug will press against the bottom of the box and cause it to fall down into the position indicated in dotted lines in Fig. 8, thus allowing the plug to drop from the box and to be withdrawn without damage to the coupling or cable. The angle at which the box is placed not only allows of this automatic uncoupling, but prevents the accumulation of dirt and water in the box.

The device operates as follows: When it is desired to signal the engineer, the conductor, brakeman, or other train-hand pulls the cord C. This rotates the drum B from left to right and allows the spring g' to contact with the point G'', thus completing the electric circuit through the generator, this circuit remaining unbroken until the lug returns to its normal position and depresses the spring. The rotation of the driving-drum, as above described, does not revolve the armature F'; but in addition to completing the circuit through the generator it winds up the spring B', so that when the cord is released this spring rotates the drum from right to left. When the drum rotates in this direction, the pawl d engages with the ratchet D, and this by means of the connections above described rotates the armature F', sending a current through the circuit until the spring g' is again depressed by means of the lug B'' and the drum stops revolving. The current thus generated passes through the cable from car to car and magnetizes the magnets K. These attract and raise the armature K'. As this armature rises, it carries up the valve I by means of its connection therewith, closes the passage J, and opens the passage J'' to the exhaust. The pressure raises the valve H', and the air or steam passing through the passage j blows the whistle, notifying the engineer. As soon as the circuit is broken, causing the cessation of the current, the armature

K', being no longer attracted by the magnets, falls through its own weight, carrying down the valve I, closing the port *i*, and opening the port I'. The air then passes through the passages J' J'' and seats valve H', being aided by means of the spring *h'*.

The advantages of using an auxiliary valve instead of allowing the electricity to act directly upon the main valve are that less expenditure of power is required to operate the device and that more prompt action is insured.

There may be one of the above-described magneto-generators in each car or only one for the train, or any other number desired.

Any other suitable means may be employed to rotate the drum B in place of the spring B', and similarly other changes may be made in form and location without departing from the spirit of my invention.

I claim—

1. In an electric train-signal, the combination of a magnet F, a revolving armature F', having a cog E', a drum B, mounted on a shaft *b* and having a pawl *d* and a lug B'', a ratchet-wheel D on shaft *b*, fastened to cog E, which meshes with the cog E', a spring *g'*, a contact-point G'', a cord C, and a spring B', whereby when the drum is revolved by a pull upon the cord the spring *g'* is released and contacts with the point G'', and when the cord is released the spring B' rotates the drum in the opposite direction to revolve the armature, generate an electric current,

and depress the spring *g'*, substantially as described.

2. An electric train-signal comprising a whistle, a main valve controlling the admission of air or steam thereto, an auxiliary valve, an electro-magnet K, having an armature connected to the stem of the auxiliary valve, a magnet F, a revolving armature F', a drum B, mounted upon a shaft *b* and having a pawl *d*, a ratchet-wheel D on the shaft, fastened to a cog E, which in turn meshes with a cog E' on the armature, a spring *g'*, depressed by a lug B'' on the drum, a contact-point G'', electrically connected with the magnet K, a signal-cord fastened to the drum B, and a spring B', the drum being revolved in one direction by the cord to release the spring *g'* and close the circuit with the magnet K and in the other direction by the spring B' to revolve the armature and generate a current to magnetize the magnet K and sound the whistle, substantially as described.

3. In an electric train-signal, a coupler comprising a plug L, having strips *l*, a box M, having strips *m*, contacting with the strips *l*, and a hinged bottom M', whereby when adjoining cars are separated the bottom will open and allow the plug to be withdrawn from the box, substantially as described.

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Witnesses:

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