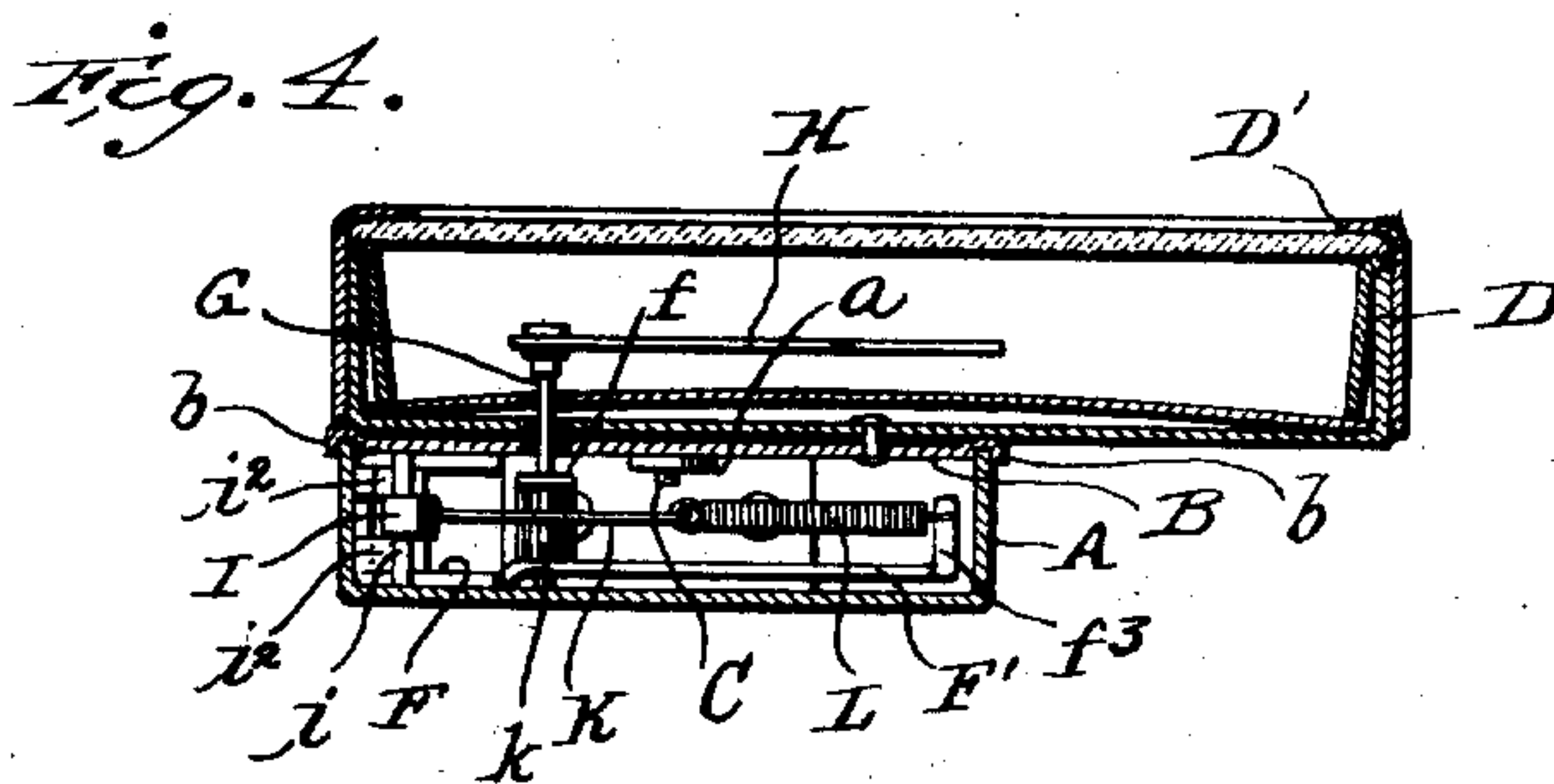
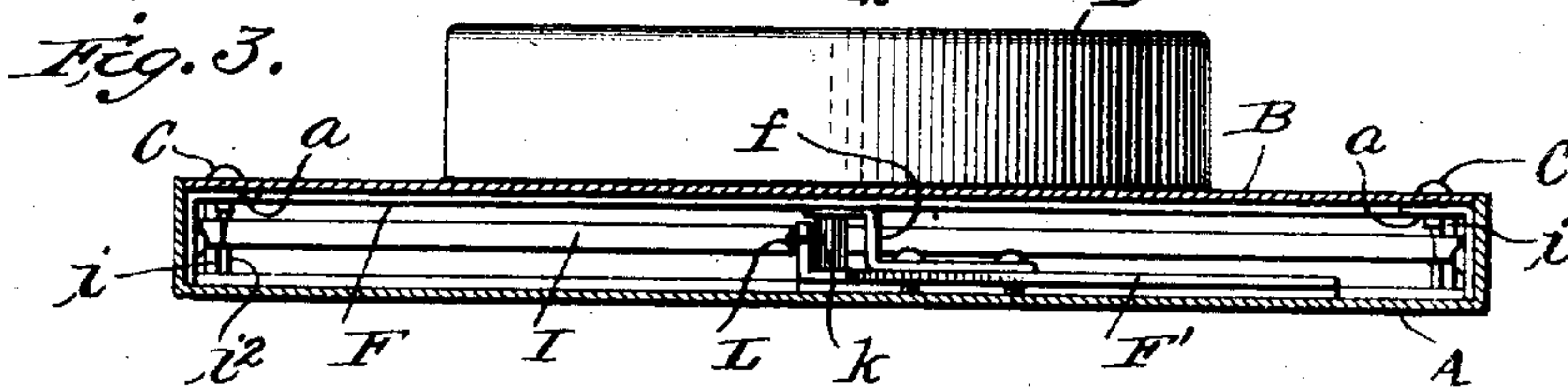
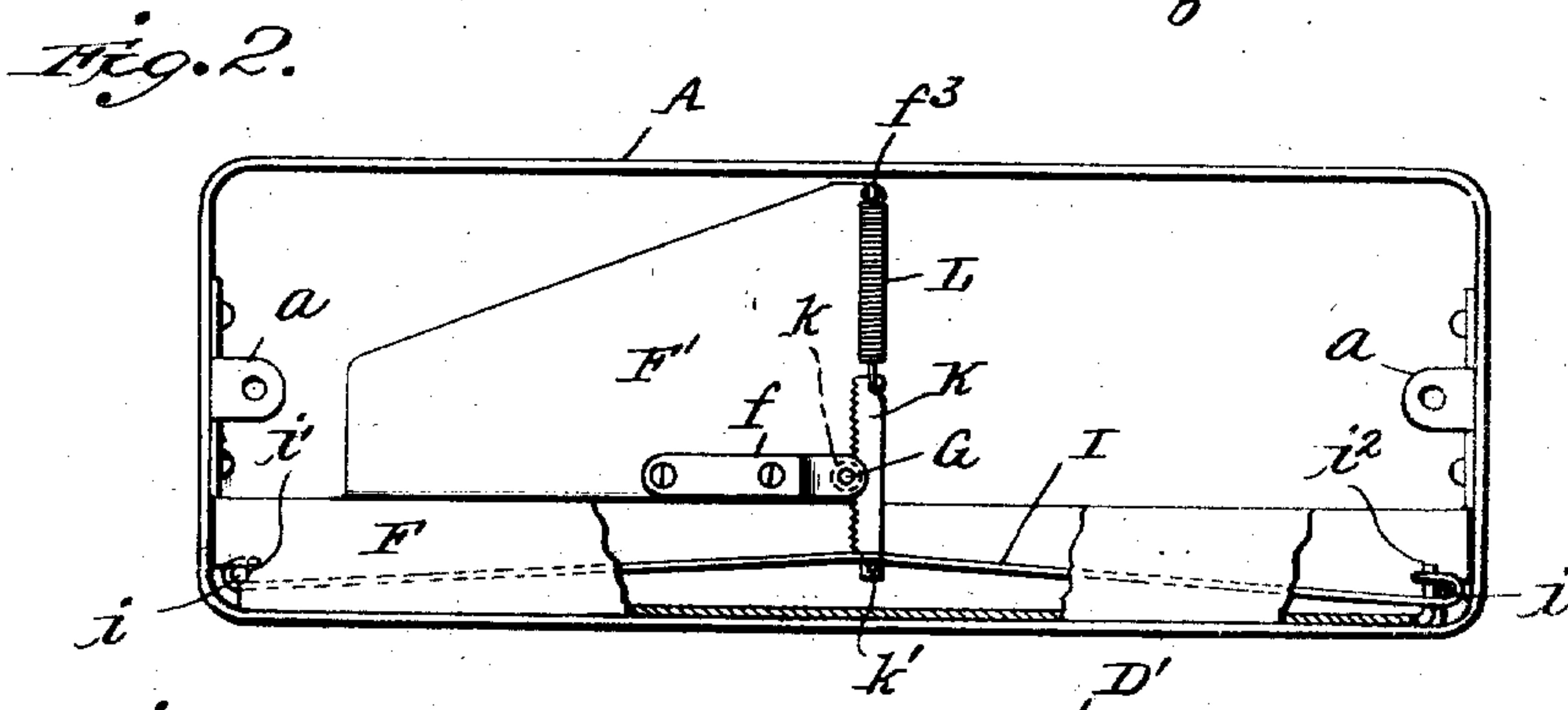
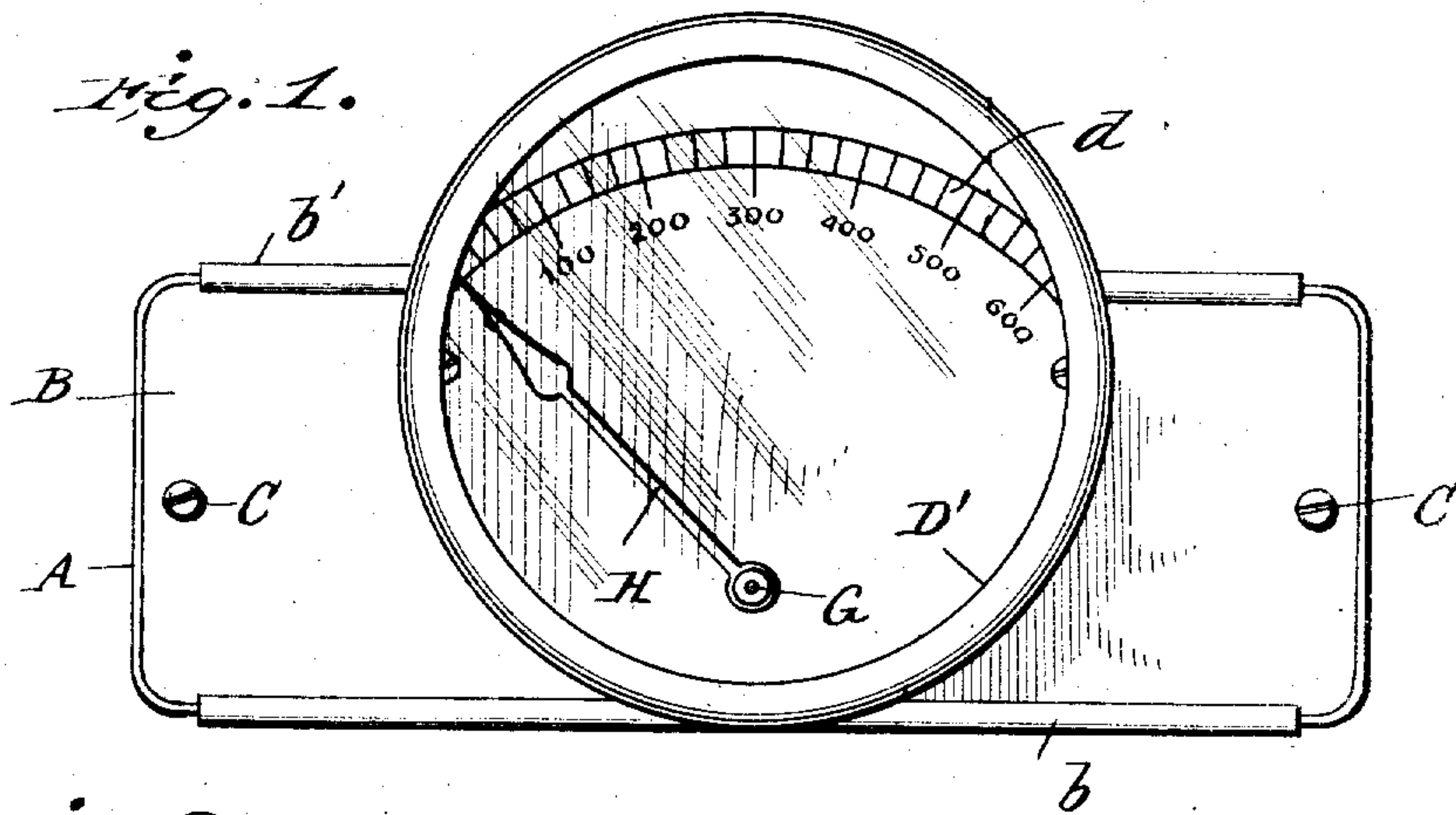


A. N. OZIAS.
TEMPERATURE INDICATING INSTRUMENT.
APPLICATION FILED DEC. 22, 1909.

973,963.

Patented Oct. 25, 1910.



Witnesses

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TEMPERATURE-INDICATING INSTRUMENT.

973,963.

Specification of Letters Patent.

Patented Oct. 25, 1910.

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To all whom it may concern:

Be it known that I, ALBERT N. OZIAS, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Temperature-Indicating Instruments; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters of reference marked thereon.

This invention relates to temperature indicating instruments and more especially those designed for indicating the temperature of baking ovens such, for instance, as the oven of an ordinary domestic stove or range, although it will be understood that the use of the instrument is not limited or intended to be limited to any particular use.

The indication of temperature conditions in the present instrument is dependent upon the different expansibility of metallic elements and is made manifest through the variations between the length of an arc and its chord, the arc being that member which is adapted to be deflected intermediate its ends and the degree of deflection being controlled by the chord member. An instrument of this type is illustrated in my prior Patent No. 904,558, dated November 24, 1908, and the present invention is an improvement upon the arrangement and construction illustrated in said patent, whereby the instrument is adapted for uses not especially contemplated heretofore and whereby the construction is greatly simplified and cheapened.

Referring to the accompanying drawings—Figure 1 is a face view of an instrument embodying the present improvements; Fig. 2 is a similar view with the front plate and dial removed and a part of the chord member broken away; Fig. 3 is a sectional view through the casing and showing the working parts in edge elevation; and Fig. 4 is a sectional view through the casing in a plane at right angles to Fig. 3 and showing the working parts in end elevation.

Like letters of reference in the several figures indicate the same parts.

The body of the casing in which the working parts of the instrument are mounted is indicated by the letter A and is preferably in the form of a pressed steel receiver of

rectangular shape with inwardly projecting brackets *a* secured in its opposite ends. The cover B is also of pressed steel with flanges *b* beaded to give rigidity to the structure and adapted to fit over the side edges of the body A. The cover B is preferably secured in position by screws C passing through the cover and into the brackets *a* before referred to. Upon the cover there is formed or mounted a dial casing D adapted to contain a quadrant dial or graduated arc *d*, the whole being preferably inclosed by a glass cover held in place by an annular flange D', the base of which is adapted to fit tightly around the dial casing and be held by friction, in a manner familiar to the arts at this time.

The working parts of the instrument, embody a chord member which is conveniently struck up from relatively heavy sheet brass or other metal having a high coefficient of expansion. The body portion F of the chord member is of channel or U-form, in cross-section, as indicated in the drawings and has on one side a bracket F', conveniently integral with the chord member and of the same material whereby differential expansion between the bracket and chord member is eliminated.

The bracket F' is provided with a supplemental arm or projection *f* and bearings are formed in the supplemental arm and bracket for a pointer or indicator shaft G adapted to project through the casing cover and dial and to carry on its end a pointer H for registering with the graduations on the dial.

The arc member is preferably in the form of a strip or thick ribbon I of steel, or other metal having a low coefficient of expansion and is located within the channel of the chord member, its ends being securely anchored to the ends of said chord member. The form of anchorage preferably adopted and illustrated in the drawings embodies a transverse anchor pin *i* around which the end of the arc member is secured, the said pin being supported in seats or recesses *i'* in the side walls of the chord member and in proximity to the base of the channel. Additional support may be given the anchoring pins by intumed arms *i''* integral with the base of the chord member, although the primary function of said intumed arms is to position the arc member or to hold the same centrally within the channel of the chord member.

The arc member and the chord member are preferably so proportioned with relation to each other that, at ordinary temperatures, if no deflecting influence be exerted on the arc member, it will be substantially straight from end to end and free from lost motion and, as the temperature rises it is put under increased tension and its rigidity increased proportionately as the length of the chord member increases. In adjusting the instrument, however, the arc member is deflected intermediate its ends by means of a rack bar K pivotally connected therewith, and at its outer end connected with a coil spring L, the opposite end of which is supported by a finger or projection f^3 on the bracket F' . The rack bar K meshes with a pinion k on the pointer shaft between the bearings in the bracket, before referred to, thus providing an operating connection between the arc member and the pointer or indicator, whereby the pointer or indicator will be turned in exact proportion to the elongation of the chord member.

In the preferred construction, the end of the rack bar is passed through an aperture in the arc member and the connection is established by a small transverse pin k' located in rear of the arc member, but it is obvious that other known forms of connection may be employed without departing from the invention.

The spring for imparting the transverse deflection to the arc member is normally under sufficient tension to provide for moving the pointer to the minimum temperature adapted to be indicated by the instrument and it will be noted that the arrangement is such that any variation due to the expansion and contraction of the spring itself is practically compensated for by a corresponding expansion and contraction of the arc member; for instance, a rise in temperature whereby the spring is elongated and to this extent its power weakened, is compensated for by a corresponding elongation of the arc member, thus if no chord member were present the pointer would remain practically stationary; as a result of this arrangement the only movement of the pointer is due to the elongation of the chord member itself, which elongation, by straightening the arc member and putting it under increased longitudinal tension, reduces the deflection in proportion to such elongation. The movement of the rack bar is, as is well known in such an arrangement, very much greater than the movement of the ends of the arc member and such movement is further amplified by the employment of a small pinion and relatively long pointer.

For the purposes for which the present instrument is designed, the augmentation of the movement through the means specified is ample for all practical purposes, even

where the length of the chord and arc members does not exceed a few inches.

The chord member, together with the parts carried thereby, is conveniently held in the casing by being fitted between one of the side walls of the casing and the ends of the brackets a , which brackets, with the ends of the casing, form seats for the ends of the chord member and the cover for the casing serves to hold said member in position and to prevent any looseness which might tend to produce inaccuracy in the registration.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is—

1. In a temperature indicating instrument, the combination with a substantially straight and rigid chord member having a high coefficient of expansion, a deflectible arc member having a low coefficient of expansion rigidly supported at its ends by the ends of the chord member, a rack bar at one end connected with the arc member intermediate its ends, a spring normally under tension connected with the opposite end of said rack bar, a pinion in mesh with the rack bar, and a pointer operated by said pinion.

2. In a temperature indicating instrument, the combination with a substantially straight rigid chord member having a high coefficient of expansion and a deflectible arc member having a low coefficient of expansion with its ends connected rigidly with the ends of the chord member, of a bracket projecting from one side of the chord member, a rack bar connected with the arc member intermediate the ends of the latter, a spring interposed between the rack bar and bracket and normally under tension tending to deflect the arc member, a pinion journaled in the bracket and in mesh with the rack bar, and a pointer operated by said pinion.

3. In an instrument such as described, the combination with a substantially straight and rigid chord member of channel form in cross-section, of a deflectible arc member having a low coefficient of expansion held under longitudinal tension by being anchored at its ends to the ends of said chord member by transversely extending supporting pins, and means whereby said arc member may be yieldingly deflected intermediate its ends, the arrangement being such that, as the temperature rises said arc member is put under increased longitudinal tension and its resistance to transverse deflection increased.

4. In a temperature indicating instrument, the combination with the substantially straight rigid chord member of channel form in cross-section, an arc member having a relatively low coefficient of expansion, transverse pins seated in the chord member at the ends and forming the anchors for the arc member, a rack bar connected with the

arc member intermediate its ends, a spring connected with said rack bar and under tension tending to deflect the arc member, a pinion in mesh with said rack bar and
5 mounted in bearings rigidly connected with the chord member, and a pointer moved by said pinion.

5. In a temperature indicating instrument, the combination with the substantially
10 straight rigid chord member having a high coefficient of expansion and of channel form in cross-section, anchor seats in the side walls of said chord member and arms in proximity to said side walls, of an arc
15 member having a relatively low coefficient of expansion, anchoring pins to which the ends of said arc member are secured, mounted in said seats, the ends of said arc member passing between and being held in proper
20 transverse position by the arms on the chord member, an indicator, a spring for deflecting the arc member intermediate its ends, and connecting mechanism between said arc member and indicator.

25. 6. In a temperature indicating instrument, the combination with the casing hav-

ing end brackets therein and a cover for said casing, of the substantially straight rigid chord member held in place in said casing by said brackets, an arc member hav- 30 ing a low coefficient of expansion anchored to the ends of said chord member, and an indicator operatively connected with the arc member intermediate its ends.

7. In a temperature indicating instru- 35 ment, the combination with the casing, the substantially straight rigid chord member having a high coefficient of expansion seated in said casing, the arc member having a low coefficient of expansion anchored at its
40 ends to the ends of the chord member, a spring for deflecting the arc member intermediate its ends, an indicator and operative connections between said indicator and arc member, of a cover for said casing; a dial
45 with which the indicator registers, mounted on said cover, and means for connecting the cover and casing, substantially as described.

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