No. 661,158. Patented Nov. 6, 1900.

# C. H. STOELTING & C. E. LINEBARGER.

## BALANCE.

(Application filed June 18, 1900.)

(No Model.)

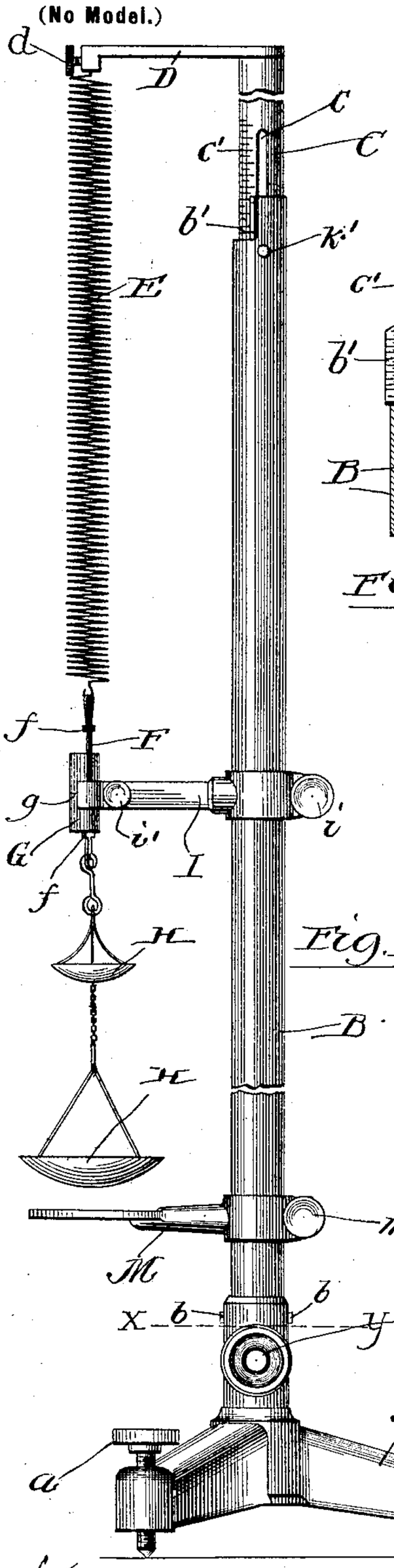


Fig. 1

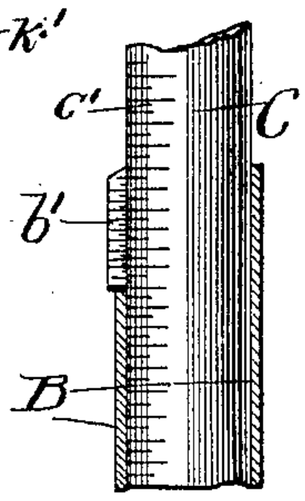


Fig. 5

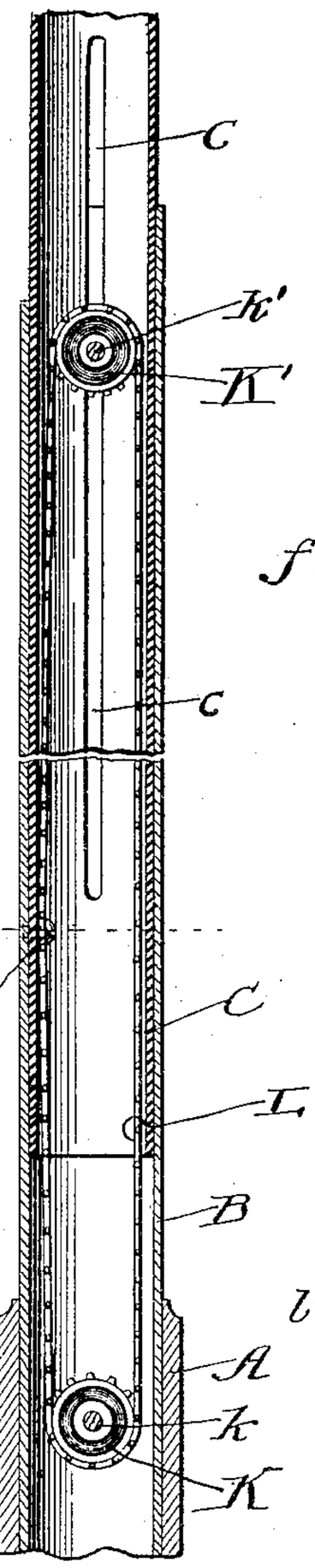


Fig. 2

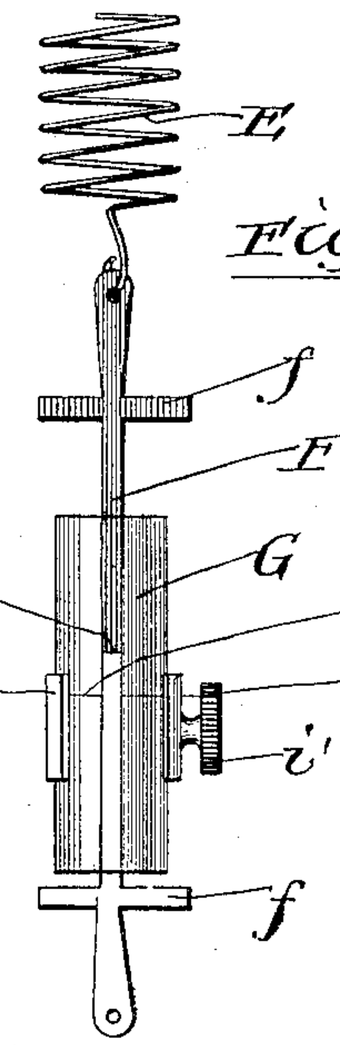


Fig. 4

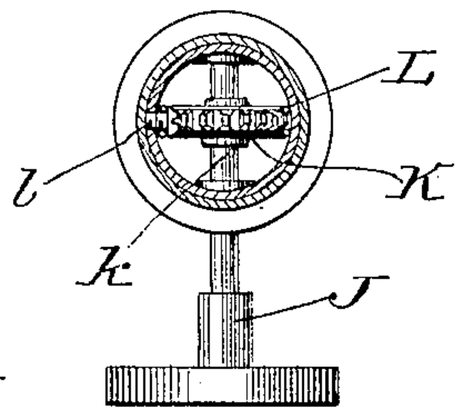


Fig. 3

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# UNITED STATES PATENT OFFICE.

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## BALANCE.

SPECIFICATION forming part of Letters Patent No. 661,158, dated November 6, 1900.

Application filed June 18, 1900. Serial No. 20,651. (No model.)

*To all whom it may concern:*

Be it known that we, CHRISTIAN H. STOELTING and CHARLES E. LINEBARGER, citizens of the United States, residing in the city of Chicago, county of Cook, and State of Illinois, have invented a new and useful Improvement in Balances, of which the following is a specification.

Our invention relates to that class of balances known to the art as "spring-balances," and has particular reference to that class of spring-balances commercially known as the "Jolly" balance. The art of this class of balances presents at the present time some marked disadvantages. The inability to control the vibration of the spring gives great annoyance. The placing of a weight in the pan subjects the spring to vibration which on account of the delicacy of the spring is extremely difficult to check. Then in the reading of weights accuracy is difficult to attain. The movement of the spring is downward and presents no opportunity to control its action. The operator is obliged to take his readings by sighting across the weighing-pan to graduations on the supporting-standard of the balance, and as the pan swings free of this standard accuracy of reading cannot be secured. It is our object in this invention to provide against these disadvantages. While the present Jolly balance consists of a spiral spring suspended from an arm projecting from an upright standard and the lower end of the spring moves downward when weight is attached to it, we reverse this principle and stretch the spring upward, holding the lower end stationary, or nearly so, and at a fixed elevation. We are thus enabled to minimize the vibration of the spring and provide a means for taking readings of measurements with great accuracy. Further, we economize time in the operation of the balance and prevent any injury to the spring by reason of a sudden strain occasioned by the application of heavy weight to the weighing-pan.

Our invention is described particularly herein, reference being had to the annexed drawings.

Figure 1 represents a general view of our balance. Fig. 2 represents a vertical sectional view of the balance-standard, showing the actuating mechanism of the balance. Fig. 3 is a cross-sectional view of balance-standard, taken through the dotted line *x y*, showing detail view of lower part of balance-standard. Fig. 4 is a detailed drawing of the spring-controlling device. Fig. 5 is a detailed drawing of the graduations for taking readings of weights.

Particularly described, A is the base of the balance, made of any desirable form.

*a a* represent set-screws intended to level the base A.

B represents the supporting-standard of the balance and is connected at its lower end with the base A by means of the bolt *b b*. Standard B is in form a tube, into which telescopes a graduated tube C. Extending at right angles from the top end of the tube C is an arm D, from which is suspended the spiral spring E, held in connection with the arm D by means of thumb-screw *d*, and which spring is well known in the trade as the "Jolly" spring. Suspended from this spring is a narrow metal strip F, having arms *f f* extending at right angles from either end, which strip is secured between the spring E and the weighing-pans H H and forms, in connection with the short tube G, a means for limiting the vibration of the spring E. The tube G is adjustably secured to the standard B by means of the bracket I, the set-screw *i* securing the bracket to the standard B and the set-screw *i'* binding the tube G within jaws of I. The metal strip F is designed to swing within the tube G, which is shorter than the distance between the cross-arms *f f*. The diameter of the tube G is less than the length of the cross-arms *f f*, and by reason of the inability of *f f* to pass through the tube G the action of F is limited.

The actuating mechanism is shown in the sectional view of the standard in Fig. 2. It consists of the sprockets K and K', which are secured one within and near either end of the standard B. The sprocket K is fitted with a shaft *k*, which is journaled in opposite sides of the standard B. The sprocket K' turns on an axle *k'*, which is secured at its terminals in opposite sides of the standard B. Around the sprockets K K' is passed an endless chain

L. This chain L is secured to the graduated tube C by means of the screw *l*, which passes through one of the links of the chain into the side of the tube C. Fitted upon the end of the shaft *k* and without the standard B is the knurled head J. By turning the head J with the fingers the sprocket K is revolved, the chain moved, and the graduated tube C raised or lowered. In opposite sides of the tube C and registering with the axle *k'* are cut two slots, one of which is shown at *c*. These slots *c* limit the action of the tube C. The axle *k'* lying within the slots checks the upward movement of the tube C when the lower end of the slot comes against it.

The tube C is graduated (*c'*) throughout its length. Attached to the upper end of the standard B and lying in close contact with the graduations *c'* of tube C is a vernier *b'*, and in the registering of this vernier with the graduations *c'* the reading of weights or measurements is taken. Upon the metal strip F is an indicating-mark *f'*, designed to register with a similar mark *g* on the tube G. We prefer to form this indicating-mark *f'* by coloring a portion of the metal strip F and allowing the line of demarcation between the colored and uncolored portions to serve as the indicating-mark *f'*. This may be accomplished, however, in many ways. The indicating-mark *g* may be formed by scratching the surface of the tube G or by any other suitable means. We would not be limited in forming these indicating-marks to the particular descriptions herein.

Adjustably secured to the standard B by means of the screw *m* is a bracket M, designed for the support of a vessel of water in which the weighing-pans H H are submerged in the taking of specific gravities and for other special purposes in the use of the balance.

The operation of the balance may be described as follows: By means of the set-screws *a a* the balance is leveled, so that the metal strip F will swing free of the sides of the tube G. Then the object to be weighed is placed in one of the pans H H. By operation of the head J with the fingers the tube C is moved and the spring E is stretched upward until the lower end of the spring swings freely and the indicating-mark *f'* of the metal strip registers with the mark *g* on the tube. Then the reading is taken at the register of the vernier *b'* with the graduations *c'*.

We would not be limited in our invention to the specific device herein described. Any suitable style or form of device for elevating the upper end of the spring may be used and any style of device for the limitation of the vibration of the spring E.

Our balance is preferably constructed of metal; but any other suitable material may be used.

The tube G we prefer to make of glass or other transparent material; but it may be constructed of any other desirable material.

What we claim as our invention is—

1. A spring-balance consisting of a base, a perpendicularly-projecting tube-standard, a tube telescoping within the standard, means for sliding the telescoping tube within the standard, an arm projecting horizontally from the top of the telescoping tube, a spiral spring suspended from the arm, a weighing-pan suspended to the lower end of the spring, and means for limiting the vibration of the spring, substantially as described and for the purposes herein set forth.

2. In a Jolly balance, means for controlling the action of the weighing-spring, consisting of a narrow strip of metal having arms projecting at right angles from either end, which is suspended from the lower end of the weighing-spring and between the spring and the weighing-pan, which metal strip swings freely within a short tube, adjustably secured, by means of a bracket, to the supporting-standard of the balance, the tube being shorter than the distance between the arms projecting from either end of the metal strip, and which projecting arms may not pass through the tube, substantially as described, and for the purposes herein set forth.

3. In a Jolly balance, means for reading weights consisting of a graduated tube supporting the weighing-spring, having telescoping engagement with a tube-standard projecting upward from the base of the balance, the graduations on the tube registering with an indicator secured to the upper end of the standard, an indicator secured to the lower end of the weighing-spring, and between the spring and the weighing-pan, an indicator projecting from the standard which is made to register with the indicator secured to the weighing-spring by raising or lowering the graduated tube carrying the weighing spring and pan, substantially as described, and for the purposes herein set forth.

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