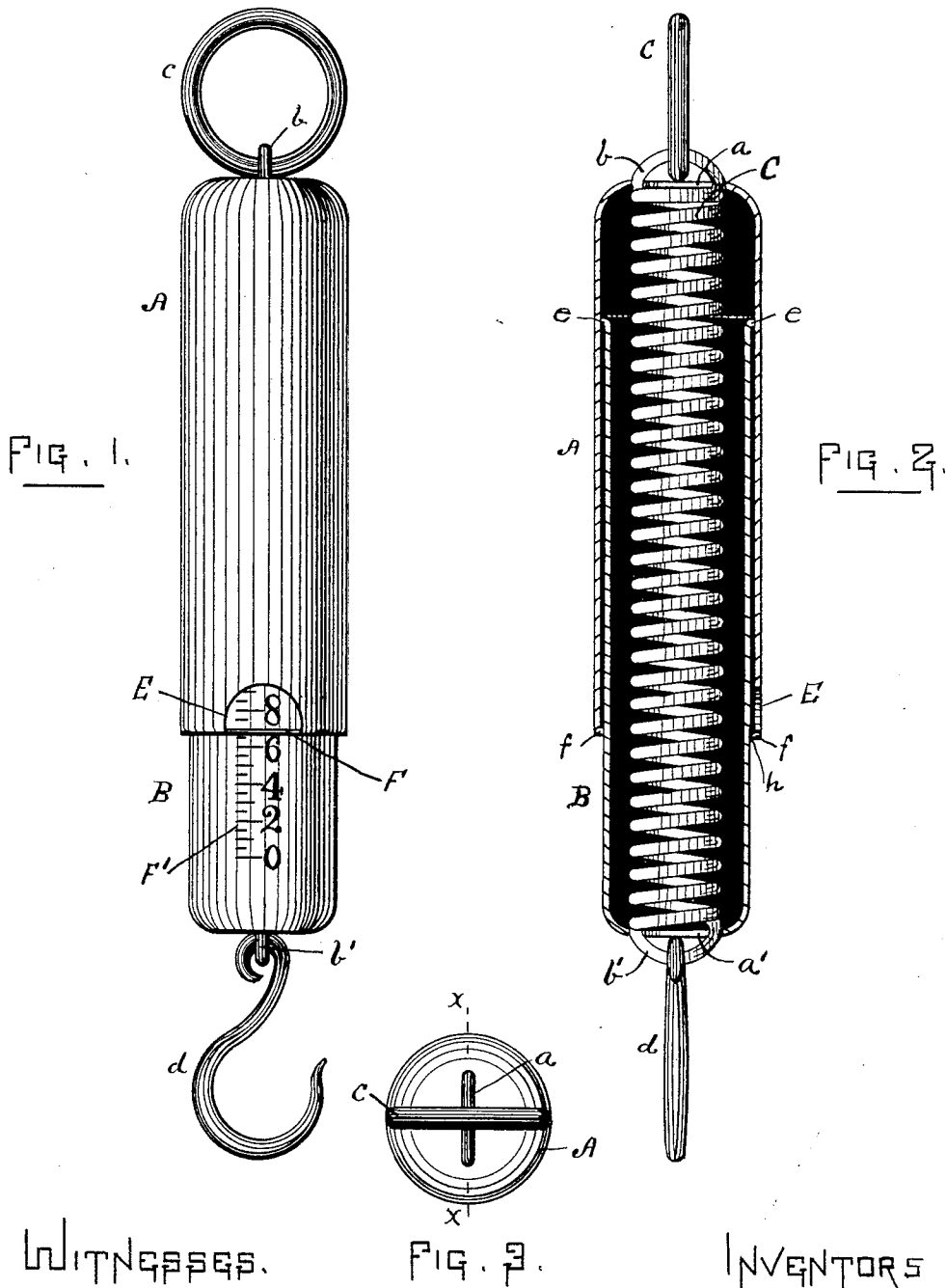


(No Model.)

F. H. MORGAN & G. H. SCOTT.
SPRING BALANCE.

No. 479,718.

Patented July 26, 1892.



WITNESSES.
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UNITED STATES PATENT OFFICE.

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SPRING-BALANCE.

SPECIFICATION forming part of Letters Patent No. 479,718, dated July 26, 1892.

Application filed August 24, 1885. Serial No. 175,155. (No model.)

To all whom it may concern:

Be it known that we, FRANCIS HENRY MORGAN, residing at Manchester, Essex county, and GEORGE H. SCOTT, a resident of Worcester, in the county of Worcester, State of Massachusetts, citizens of the United States, have invented certain new and useful Improvements in Spring-Balances, of which the following is a specification, accompanied by drawings illustrating a spring-balance embodying the several features of our invention, and together giving such a full, clear, and exact description as will enable those skilled in the art to construct the same.

Our invention relates to that class of spring-balances in which a telescopic tube or shell is employed consisting of an outer and an inner concentric shell or tube, with their outer ends closed and connected by an inclosed spiral spring whose tension resists the outward longitudinal motion of the inner shell or tube, whose outer surface is graduated to indicate the strain resisted by the spring.

In the drawings, Figure 1 shows an elevation of our improved spring-balance. Fig. 2 is a vertical sectional view on line xx , Fig. 3. Fig. 3 is a top view.

Similar letters indicate like parts in the several views.

A denotes the outer and B the inner shell or tube, made, preferably, of sheet metal, each having its outer end closed and provided with a slot a a' , through which the looped ends b b' of the spiral spring C pass. Through the loop b we pass a ring or other suitably-shaped handle c , and to the loop b' we attach a hook d . The inner end of the tube B is provided with a flange e , turned outward, and the open end of the tube A has a similar flange f , turned inward. These flanges stiffen the edges of the thin sheet-metal tubes, and the inner flange e , striking against the flange f , limits the motion of the inner tube and prevents its being withdrawn from the outer tube. The use of the flanges also reduces the surfaces in contact between the two tubes and allows the edges of the flanges to be closely fitted to the opposing surfaces of the tubes, so as to prevent lateral motion between them.

The outer surface of the inner tube is grad-

uated at F' to indicate in pounds or fractional parts the resistance of the spring at the different positions assumed by the inner tube as it is withdrawn. In the lower end of the outer shell A we form an opening E, disclosing the graduated surface of the inner tube and having the flange f extended across the opening, with its inner edge h resting on the graduated portion of the inner tube and forming an index-bar F. For convenience in reading the inner edge h of the bar F should be brought to a knife-edge, so that each of the graduations upon the inner tube may be readily observed when coincident with the index-bar F.

We do not confine ourselves to the special manner above described of forming the index-bar F by a continuation of the flange f , as it will be obvious that a short longitudinal slot might be formed in the outer tube and an index-pointer be attached to the outer tube and extend from one side partially across the slot, with its pointed end brought over the graduations of the inner tube.

We are aware that spring-balances have been heretofore constructed having a slot or opening in the outer tube, with graduations arranged along the side of the opening and a movable index-pointer sliding in the opening of the tube; but this means of indicating the weight requires a slot in the outer tube equal to the entire movement of the pointer. Spring-balances have also been made in which the graduations have been placed upon the outer surface of the inner tube and the edge of the outer tube used as an index, a notch being formed in the edge of the outer tube to disclose a portion of the graduated surface of the inner tube; but this construction requires the relative position of the tubes to be reversed, the inner tube being held uppermost and the load attached to the outer tube, which is objectionable, as it leaves the joint between the two tubes exposed to the entrance of dust or moisture, which may be carried into the outer tube by their own gravity. This manner of constructing spring-balances also lacks that feature of our improved balance which is essential to a ready and instantaneous reading of the graduated scale—viz, an

index-pointer presenting an "edge" to the graduations, so the exact point of the coincidence may be observed.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In a spring-balance, the combination of the telescopic tubes, the inner tube being provided with a graduated scale and the outer tube with an opening disclosing said scale, a spring connecting the end of one tube with the opposite end of the other tube, the outwardly and inwardly turned flanges, whereby the sliding motion of said tubes is limited in one direction, and an index-bar extending across the opening of the outer tube, said index-bar being formed by the inwardly-turned flange of said tube, substantially as described.

2. In a spring-balance, the combination of the telescopic tubes having their outer and opposite ends closed and provided with slots, a spring connecting said closed ends by means of loops formed in the ends of said spring, said loops passing through said slots, and wires passed through said loops outside the closed

ends of said tubes, whereby the end coils of said spring are drawn against the inside of the closed ends of said tube, substantially as described.

3. The combination, with the inner tube having its outer surface graduated, of an outer tube having a flange turned inwardly at its overlapping end and an opening at said end disclosing the graduations on the inner tube, said flange being carried across said opening and forming an index-bar, as and for the purpose set forth.

4. The combination, with the outer and the inner concentric sliding tubes or shells and a spiral spring connecting the same, substantially as described, of a graduated scale on the outer surface of the inner tube, the outer tube or shell having an opening E and an index-bar F, as and for the purpose set forth.

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Witnesses:

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