Knapp & Bailey,

Curtain Fixture.

No. 102,409. Patented Apr. 26. 1870.

Fig. 1.

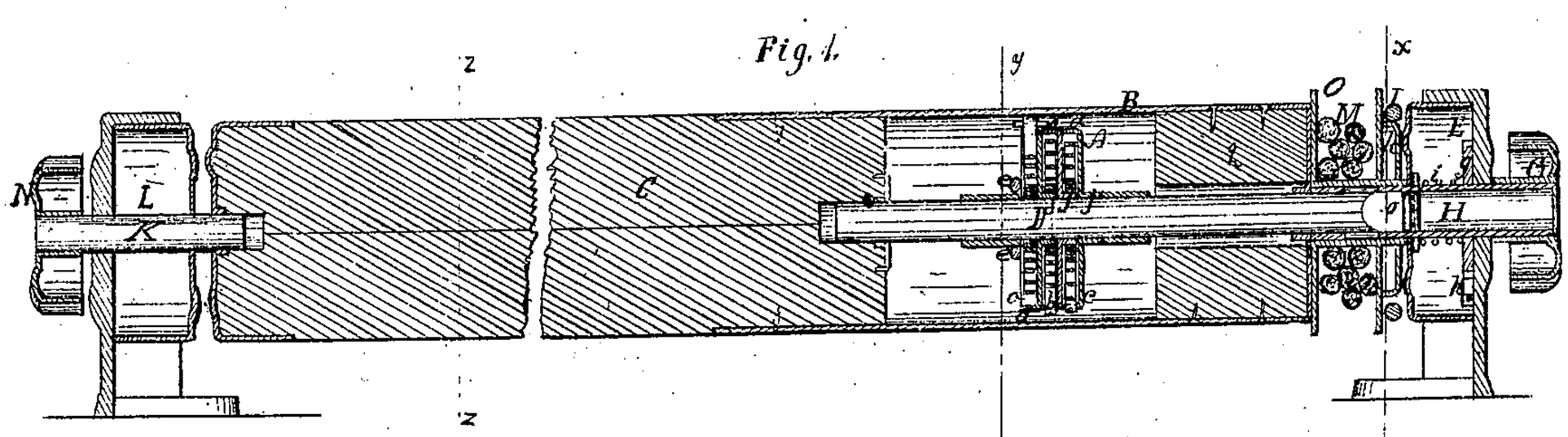


Fig. 4.

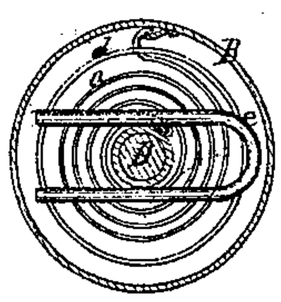


Fig. 3.

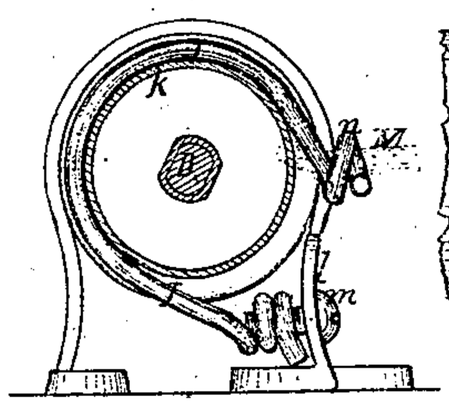


Fig. 2.

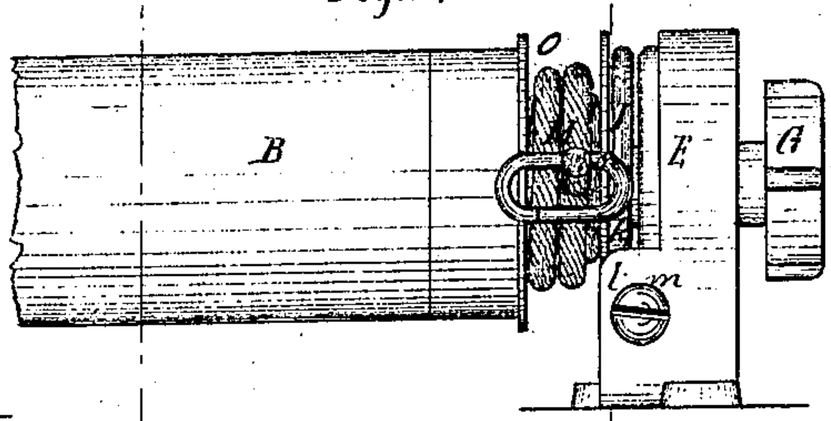


Fig. 5.

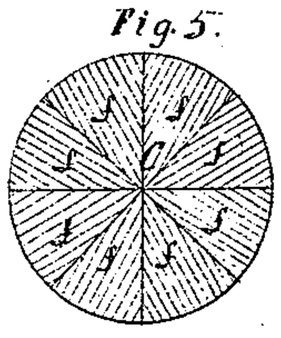


Fig. 6.

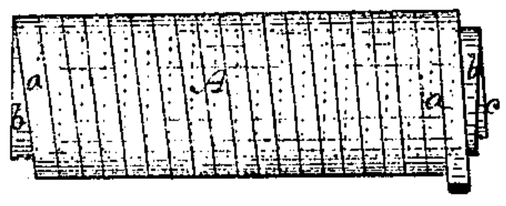
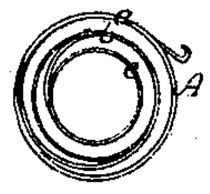


Fig. 7.



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UNITED STATES PATENT OFFICE.

A. HAYDEN KNAPP, OF NEWTON CENTRE, AND GEORGE W. BAILEY, OF BOSTON, MASSACHUSETTS; SAID BAILEY ASSIGNS HIS RIGHT TO SAID A. H. KNAPP.

IMPROVED CURTAIN-FIXTURE.

Specification forming part of Letters Patent No. **102,409**, dated April 26, 1870.

To all whom it may concern:

Be it known that we, A. HAYDEN KNAPP, of Newton Centre, in the county of Middlesex, and GEORGE W. BAILEY, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Curtain-Fixtures; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification—

Figure 1 being a central longitudinal section of the improved fixture; Fig. 2, a bottom view of the fixture, without the stick and left-hand bracket; Fig. 3, a transverse section thereof in a plane indicated by the line *x x*, Figs. 1 and 2; Fig. 4, a transverse section in a plane indicated by the line *y y*, Figs. 1 and 2; Fig. 5, a transverse section in a plane indicated by the line *z z*, Fig. 1; Fig. 6, a side view of a modified construction of the spring, and Fig. 7 an end view of the same modification.

Like letters designate corresponding parts in all of the figures.

The leading object of our invention is to produce a spring-balance fixture with the spring in a cylindrical case or barrel on or forming a continuation of the stick, and occupying as little length as possible, so as not to interfere with the nailing of the curtain or shade to the stick, as if it were entirely of wood, and at the same time to secure sufficient length of spring to dispense with gearing.

We accomplish these purposes by means of an improved spring, A. It is formed either of separate series of spirals or coils, united at one end of each of the adjacent series by suitable connections, or is made in a single continuous spring formed of redoubled or concentric series of spirals or coils.

In Figs. 1 and 3 separate coils *a b c* are represented, each being placed in a cup-shaped holder, *d*, so that each holder may turn with its coil separately on the shaft D, and the spring of one holder is connected with the adjacent holder, each of which holders has a projecting hub or tubular eye, *j*, extending into the next holder for the purpose of receiving the inner end of the spring thereof, while the outer end of the said spring is secured to the periphery of its own holder.

As represented, the first spring, *a*, is secured at its inner end to the shaft D, its outer end being attached to the inclosing periphery of its holder. Then the next spring, *b*, is attached at its inner end to the tubular eye *j* of the holder of the first spring, *a*, and likewise at its outer end to the periphery of its own holder. Then the next spring, *c*, is attached at its inner end to the tubular eye *j* of the holder of the spring *b*, and its outer end projects through the periphery of its holder, and is attached to the inner periphery of the case or barrel B. Any number of springs *a b c* can be thus connected, all acting as a single spring, and the number can be increased or diminished as required, according to the length of spring found necessary in any case.

The different coils *a b c* might be connected as one spring; but there are practical difficulties in their construction and use which render them inferior to the separate springs connected by the spring-holders *d d*. But the single spring shown in Figs. 6 and 7 may be easily made and used to advantage. It is composed of concentric spirals *a b c*, one within another, each spiral being formed of as many turns of the wire or ribbon of which it is made as required, and there being as many of the concentric spirals as the diameter of the inclosing case or barrel B may admit or the requirement of the spring indicate. The successive spirals are connected first at one end and then at the other end of the spring.

It is obvious that in effect this spring is equivalent to a spring of a single spiral as long as all of these concentric spirals together, and hence that we are enabled by this construction to shorten the spring as many times as there are concentric spirals. Thus with three spirals, as shown, we have only one-third of the length that would be required in a single spiral. Practically more than three spirals may be used, and we find that we need a spring not exceeding three or four inches in length for any fixture, whereas the single-spiral spring is required to be some twenty inches long.

We find it to be a further improvement on the spring to make it of a flat steel ribbon, spiral springs usually being made of round wire. This ribbon we wind flatwise, as shown, and thereby are enabled to occupy so little space with each spiral as to admit a larger number of them in the same diameter of case than if made of round wire; also, by using the flat spring, we need one-half less length, it having a larger range of flexibility and elasticity without giving way than the round wire spring; and by making it of steel we can temper it more uniformly than wire can be drawn, especially if of brass.

As a modification of this construction of the spring, the flat ribbon might be wound edgewise, thereby obtaining a larger number of turns in the same length of spring, but, on the other hand, getting fewer concentric spirals; and such a spring would be somewhat more difficult to wind.

One great advantage of the concentric spiral spring is that it can be adapted to varying weights of curtains and shades. A light shade, requiring a less rapid change in the strength of the spring as it winds up or unwinds, needs a longer spring of a given strength than a heavy shade. These concentric springs may all be made alike, long enough for the lightest shades in market, and then are adjusted and adapted to heavier shades by cutting off one or more of the concentric spirals, the length of the spring remaining unchanged. But the compactness of our connected coil or concentric spiral springs is their great excellency.

The single-spiral spring occupies most of the length of the stick, which should be of wood, since a hollow tin or brass cylinder is not practical, the great varying widths of windows rendering it necessary to cut the stick in almost all cases, and metallic cylinders cannot be conveniently shortened for the purpose, in using, by the people at large. Besides, the curtain or shade cannot be tacked to the metal, and for a metallic barrel it is necessary to hem a cord in the end of the curtain and attach it at the ends thereto. Then, if the shade does not wind up true, the cord must be ripped out and the hemming done over again, and this must be repeated till the shade hangs right; but with our short barrel, B, required with our improved spring A, the wooden stick C occupies most of the width of the window, and the barrel does not interfere with the ordinary tacking on of the shade, especially if a short wooden block, *q*, is secured to the outer end of the barrel, as shown in Fig. 1, so that the corner of the shade can be tacked on.

We also have an improved construction of the wooden stick C, as indicated in Fig. 5. It is made of several strips, *f f*, joined and glued together in radial lines, or nearly so. By this construction we avoid the springing and crooking of the stick, which fault is so common with sticks turned from single pieces; and the cost is little, if any, greater than when made of single pieces, if convenient machinery for making the sticks is used, for the reason that much smaller and inferior stuff answers to make them of, while sticks from single pieces have to be made from the straightest grains and best material. The strips *f f* may be made of two or more kinds of wood, joined alternately, if desired.

The shaft D of the spring projects from the barrel B, and is coupled at *o*, Fig. 1, to a shaft or tube, H, extending through the bracket E, and provided with a knob or head, G, to turn it by. Inside of the bracket E there is a ratchet-wheel, *g*, on the shaft H, and into this a detent, *h*, takes, held thereto by a spring. By means of this ratchet-wheel and the knob G the spring A is wound up to any degree of force required, so as to adjust it to the weight of the curtain or shade. Thus, a spring-balance fixture is produced without gearing of the simplest and cheapest construction, and very convenient to use.

The knob-shaft H, as represented, is arranged to be drawn out lengthwise far enough to uncouple it from the spring-shaft D, there being a coiled spring, *i*, on it inside of the bracket E, to hold it coupled to the said spring-shaft, except when the shade is to be taken down. But the coupling arrangement may be applied to the left-hand bracket L and its pivot K and knob N. In that case the shaft D may extend through the bracket E.

It is difficult to make springs that are precisely adapted to every varying size and weight of curtains and shades. Springs also are apt to give way and diminish in strength by use. A balance-fixture, to be perfectly desirable, should balance quite exactly at all times. On this account, to obviate all imperfections as far as possible, we have in the present invention combined with the spring-balance a friction-brake and cord device, so that, if the curtain or shade is not fully balanced by the spring, the brake holds it up securely; and, if the spring fails to draw up the curtain or shade on lifting its weighted end, the cord may be used to assist; or, as when the shade extends down, or nearly down to the floor, and it is inconvenient to stoop to lift the lower end, the cord may be used exclusively for raising the same. For this purpose we use an improved friction-brake, arranged so that on pulling the cord its pressure is thereby taken from the curtain-roller or stick, and it ceases then to act as a brake. The construction and arrangement of the device are shown in Figs. 2 and 3.

On the end of a stick is secured a cord-spool, *o*, and a friction-wheel or drum, *k*, thereon, close to the bracket E, and to a suitable projection, *l*, of the bracket is attached a spring or spring-wire, I, by means of an adjusting-screw, *m*. This spring-wire extends behind and upward around the drum *k*, upon the periphery of which it presses with the required force, adjusted by the said set-screw *m*. Its free end projects downward and partly back-

ward under the drum, and terminates in a loop or bow, *n*, through which the cord M runs as it winds upon or unwinds from the spool O. This loop is so situated and arranged that, when pulling down on the cord for raising the shade, it will draw the spring away from contact with the drum and relieve the friction of their contact, and then the brake offers no resistance to the raising of the shade, but it immediately resumes its pressure when the loop is let go. The loop *n* is formed by bending the end of the wire round in open turns, so that the cord can be inserted and taken out without running it endwise through the loop, as represented. The friction-brake and cord, of course, may be used on ordinary fixtures without the spring-balance. Another improved balance may be used without the improved brake.

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

1. The improved balance-spring A, formed of separate springs, *a b c*, united by connecting holders *d d d*, or of concentric or redoubled series of spirals or coils, *a b c*, as and for the purposes herein specified.

2. Also, the combination and arrangement of the spring A in a metallic barrel or case B on the stick C, the shaft D turning in the said case, and the shaft H, with its head or knob G, turning in the bracket E, with ratchet and pawl, and coupled to said shaft D, as herein specified.

3. Also, forming the stick C of several sections of wood, extending from center to circumference, and joined radially, as herein set forth.

4. Also, the adjustable brake-spring I, with its open loop *n*, arranged in combination with the drum *k* and cord M, as and for the purposes herein specified.

The above specification of our improvements in curtain-fixtures signed by us December 4, 1869.

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GEORGE W. BAILEY.

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