J. E. ATWOOD.

SUPPORT FOR SPINDLES FOR SPINNING MACHINES.

No. 253,572. Patented Feb. 14, 1882.

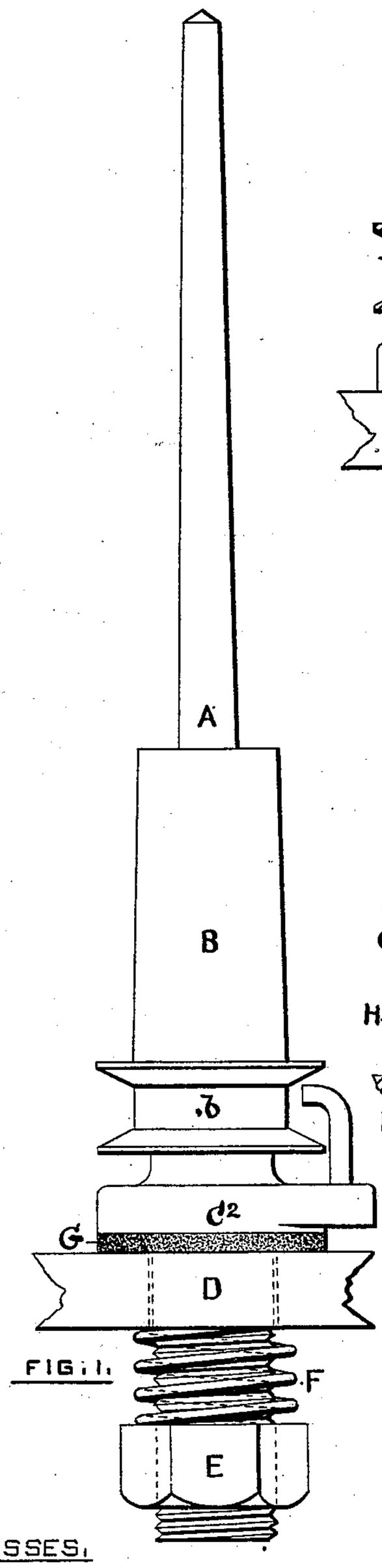

FIG. 1.

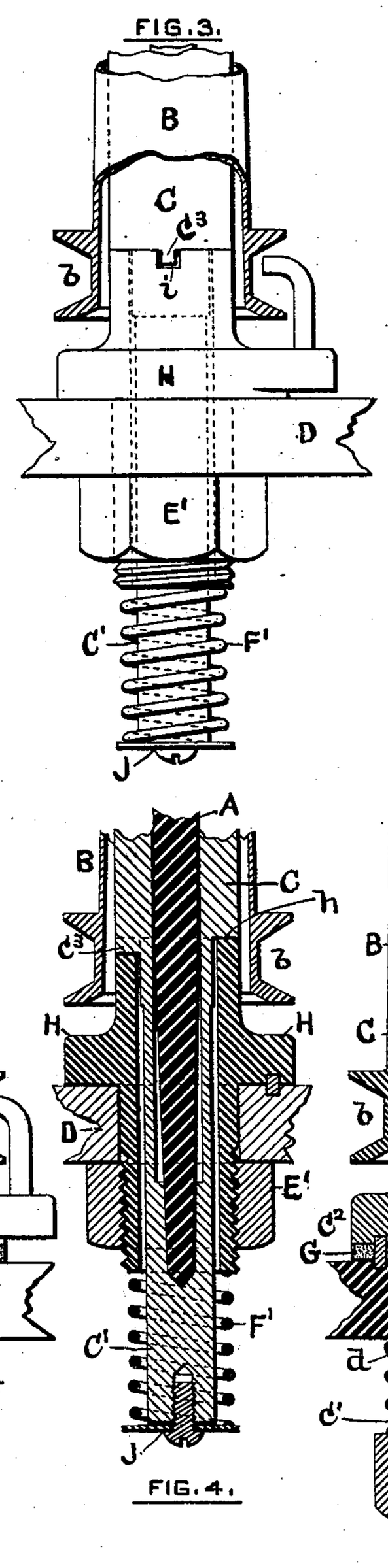

FIG. 3.

FIG. 4.

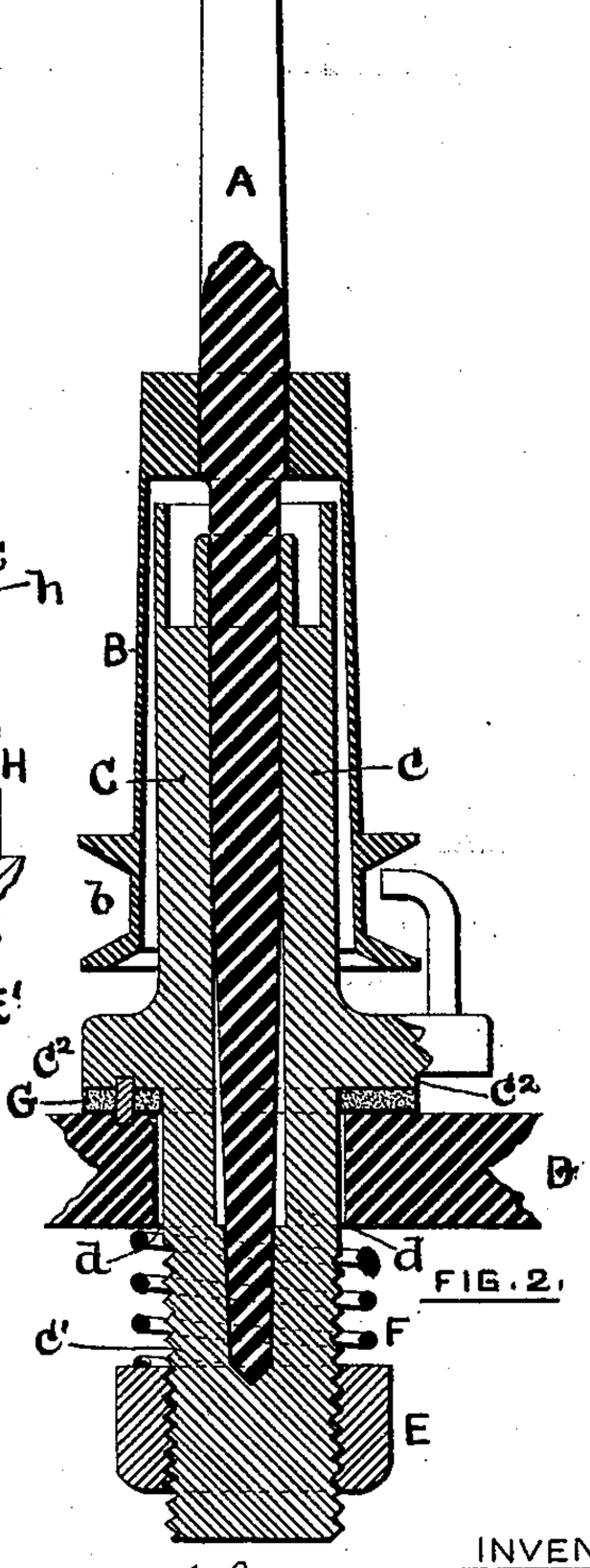

FIG. 2.

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SUPPORT FOR SPINDLES FOR SPINNING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 253,572, dated February 14, 1882.

Application filed February 27, 1880.

To all whom it may concern:

Be it known that I, JOHN E. ATWOOD, of Stonington, in the county of New London and State of Connecticut, have invented a new and useful Improvement in the Supports for Spindles for Spinning-Machines; and I do hereby declare that the following specification, taken in connection with the accompanying drawings, forming a part of the same, is a full, clear, and exact description thereof.

My said improvements pertain to what are known as "self-adjusting spindles;" and my invention relates to improvements in mounting that class of such spindles having step and bolster bearings within a supporting-tube.

The features deemed novel will hereinafter be specifically designated by the claims hereunto annexed.

Prior to my present invention spindles for spinning were rendered capable of more or less self-adjustment in various ways, which I will briefly specify as follows: by means of a movable bolster mounted within a leather diaphragm connected with the spindle-rail and employed with a fixed step, as illustrated in the English Letters Patent of Wright, No. 7,127, A. D. 1836; also, by providing a separate yielding bolster-bearing and step-bearing, as shown in the English Letters Patent of Raworth, August 5, 1874. As my present invention relates to that class of spindles which are mounted within a supporting-tube containing both the bolster and step bearings, these prior spindles are referred to merely as instances illustrative of prior methods of attaining the self-adjustability of spindles for spinning. Spindles of the class to which my present invention pertains have also heretofore been provided with bearings, so as to afford the desired self-adjusting capacity, and that improvement is recognized by myself and others as the invention of Francis J. Rabbeth, who has combined with a sleeve-whirl spindle a supporting-tube fixed with relation to the spindle-rail and a movable bearing for the spindle within said supporting-tube, which is cushioned with relation to said tube. This construction affords a capacity for more or less lateral movement of the spindle and its movable bearings in all directions within said supporting-tube and independently thereof, because said tube is fixed with relation to the spindle-rail.

The characteristic feature of my present invention is a supporting-tube which is flexibly mounted with relation to the spindle-rail and contains the step and bolster bearings for the spindle, so that the latter and said tube may move together laterally in all directions during the self-adjustment of the spindle, while carrying an unequally-balanced bobbin and its yarn, instead of relying upon the movement of the spindle and its bearings within and independently of the supporting-tube, as heretofore in this class of spindles. By reason of my improvement the means whereby the movable capacity or flexibility of the spindle is afforded are rendered openly accessible, and more easily renewed, if need be, than heretofore; and, further, elastic materials may be successfully employed, which would be liable to injury and rendered inelastic by oil if located within the supporting-tube, as heretofore. I am also enabled to readily graduate the degree of flexibility of the spindle with relation to the spindle-rail, so as to accommodate the self-adjusting capacity of the spindle to the various conditions incident to its use in working with bobbins materially differing in size and weight. All of these advantages are due to the novel characteristic feature before referred to.

Referring to the drawings, Figure 1 represents in elevation a mounted spindle embodying my improvement. Fig. 2 shows the same in vertical section. Fig. 3 represents in elevation and partial section a modification of my improvement, and Fig. 4 shows the same in vertical section.

The spindle chosen to illustrate my invention is of that well-known variety which is constructed with a sleeve attached to the spindle-blade, extending downwardly, so as to encompass a support containing the bolster-bearing, and which has a driving-whirl located at or near the base of such sleeve. Such spindles have their foot-rests in the base or closed end of the bolster-support, and the spinning-frame therefore requires only one spindle-rail.

As shown in all the figures of the drawings,

A represents the spindle, B the sleeve, and *b* the whirl thereon. As shown in Fig. 2, the spindle is mounted in a supporting-tube, C, which extends both above and below the spindle-rail D, and furnishes an upper or bolster bearing for the spindle in its portion *c* and a lower or step bearing in its portion *c'*. The supporting piece or tube C, containing as it does the bolster and step bearings for the spindle, constitutes a combined bolster and step, which moves laterally with the spindle in all directions during its self-adjustment.

In order to permit the supporting-tube C to move with the spindle, as described, the spindle-rail D has a circular opening, as at *d*, Figs. 1 and 2, which has a diameter slightly greater than the diameter of the lower portion, *c'*, of the tube C, so that between their coincident surfaces an ample annular space is afforded to allow of the desired lateral movement of said tube and the spindle contained therein. For so securing the supporting-tube and its spindle to the rail D that they will nevertheless be capable of the requisite lateral movement incident to the self-adjustment of the spindle, the lower end of the tube *c'* is screw-threaded and provided with a nut, E. A strong spiral spring, F, the tension of which may be variably regulated by said nut, surrounds said portion of the supporting-tube between the nut and the under side of the rail, and the base or flange portion c^2 of said tube is seated upon a washer or annulus, G, of flexible or elastic material, placed between said base and the top of the rail.

The spring F, employed with the nut, (when considered merely as a part of the securing device,) operates as an auxiliary to the cushion G, the two practically co-operating as one spring or cushion so far as relates to providing for the elastic flexibility of the supporting-tube with relation to the spindle-rail. The clamping-nut and spring, in addition to serving as means for securing the supporting-tube to the rail, also serve as means for graduating the degree of elastic flexibility of the spindle. In other words, it enables the spindle to be adjusted with more or less sensitiveness, according to whether it carries a light or a heavy bobbin, and also according to whether it be run at low or at high speed, it being obvious that the tighter the spring be set by its nut the more firmly will the supporting-tube be held and the less sensitive will the spindle be in its capacity for self-adjustment. It is also obvious that in this method of adjustment the cushion G will be under more or less compression, exactly corresponding in that respect with the condition of the spring F, and that therefore, when considered in connection with said feature of adjustment, the cushion and spring co-operate as one device. It will further be seen that the cushion G at its interior annular edge affords an elastic abutment for the adjacent sides of the supporting-tube during its lateral movement, and also that it permits of the free rocking movement of the supporting-tube, because said tube, by its flange, rests bodily upon said cushion with its entire weight, together with that of the spindle and its load; also, that said cushion is not exposed to saturation with oil, as is the case with cushions or yielding material located within the supporting-tube, as heretofore, and it can therefore better and longer retain its elastic property; also, that should said cushion be so far compressed and lifeless as to improperly serve its purpose it can more readily be removed and another substituted than those which are contained within the supporting-tube and between said tube and a separate bearing for the spindle, as heretofore.

As will be readily seen, it is preferable that the cushion G be employed; but approximately desirable results may be attained by the spring F if the bearing-face of the flange c^2 be beveled or rounded, so that the supporting-tube C will be capable of readily rocking upon its seat on the spindle-rail in any direction from the perpendicular.

Another construction is illustrated in Figs. 3 and 4, by which the supporting-tube and its spindle are flexibly mounted with relation to the spindle-rail in accordance with my invention, but without the cushion G, previously described. In this construction I employ what I believe to be a novel feature in connection with the mounting upon their rails of supporting-tubes containing step and bolster bearings for spindles. Instead of mounting said supporting-tube directly upon the spindle-rail, as heretofore, I employ an intermediate base-piece, which is internally chambered to partially receive the supporting-tube, is provided with a flange for contact with the upper surface of the rail, and a shank or neck for occupying a circular opening in the rail, to which it is rigidly secured. In this instance the flanged base H is tubular in form, threaded at its lower end, and firmly secured to the spindle-rail by the nut E'. The supporting-tube *c c'*, like the one before described, contains both the upper and lower bearings for the spindle; but its lower portion is partially located within the base H, as is clearly shown in the drawings. The upper portion, *c*, of said tube contains the upper or bolster bearing, and the lower portion, *c'*, contains the step-bearing. Said tube is provided at *h* with a shoulder, which, as a supporting-shoulder, corresponds with the under side of the flange c^2 in the construction previously described. The lower end, *c'*, of the supporting-tube extends through the base H sufficiently to afford space thereon for the reception of a helical expansive spring, F', (or other yielding and elastic cushion capable of being compressed,) between the lower end of the base and a plate actuated by the screw J, or by the equivalent adjusting-nut E, previously described.

In both forms of construction the supporting-tube is prevented from rotation with the

spindle, and for this purpose, as shown in Fig. 2, a pin is employed extending from the flange c^2 into the rail, through the cushion G, and in Figs. 3 and 4 the supporting-tube is shown to be provided with a lug or pin, c^3, which occupies a slot, *i*, in the top of the base H. The shank or lower portion, c', of the supporting-tube is considerably smaller in diameter than the interior of base H.

With the parts thus constructed it is obvious that the spindle and the supporting-tube containing the bearings will be capable of more or less rocking movement as well as radial movement in all directions, and therefore the spindle, when revolving, will be able to adjust itself to an unbalanced bobbin and yarn load under the same conditions and substantially in the same manner as described in connection with the spindle shown in Figs. 1 and 2. The absence of the previously described cushion G from this last described construction is partially compensated for by the spring, because the latter maintains a yielding control of said tube and the spindle contained therein during their variations in position incident to self-adjustment. As before stated, I prefer to employ the upper cushion, because with that more satisfactory results may be attained; but the spring alone constitutes a valuable means for attaining to a valuable degree a flexible connection of the supporting-tube and its spindle with the spindle-rail.

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

1. The combination, substantially as hereinbefore described, with a spindle-rail, of a sleeve-whirl driven spindle and a combined bolster and step mounted loosely on the spindle-rail and secured with relation to the rail by yielding attachments, as set forth, whereby the spindle is capable, while in revolution, of adjusting itself to an unbalanced load.

2. The combination, substantially as hereinbefore described, with a spindle-rail, of a sleeve-whirl driven spindle, a base-piece rigidly fixed to the spindle-rail, and a combined bolster and step mounted loosely in said base-piece and secured thereto by a yielding attachment, as set forth.

3. The combination, substantially as hereinbefore described, of a spindle-rail of a spinning-machine, a spindle, and a supporting-tube flexibly mounted with relation to the spindle-rail and containing step and bolster bearings.

4. The combination, substantially as hereinbefore described, of a spindle-rail, a spindle, a supporting-tube containing step and bolster bearings, flexible connections between said tube and the spindle-rail, and adjusting devices for varying the degree of flexibility of the supporting-tube and spindle therein.

5. The combination of the spindle-rail, the spindle, the supporting-tube, loosely mounted with relation to the rail and containing the step and bolster bearings for the spindle, the spring, and the nut for compressing it, substantially as described.

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