(No Model.)

H. D. KLOTS.

SPINNING SPINDLE.

No. 545,590 Patented Sept. 3, 1895.

Fig. 1,

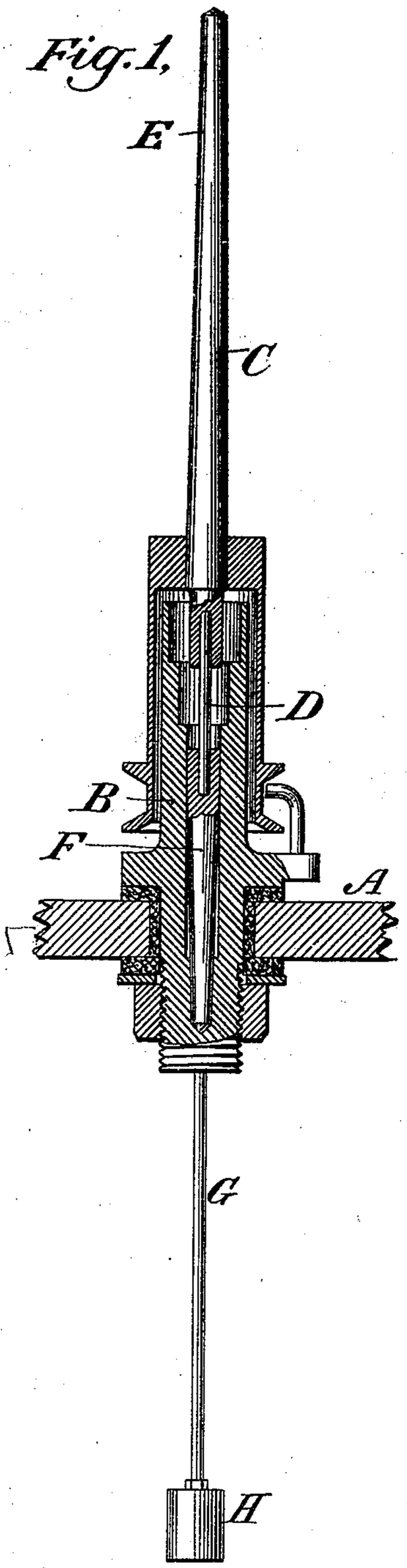


Fig. 2,

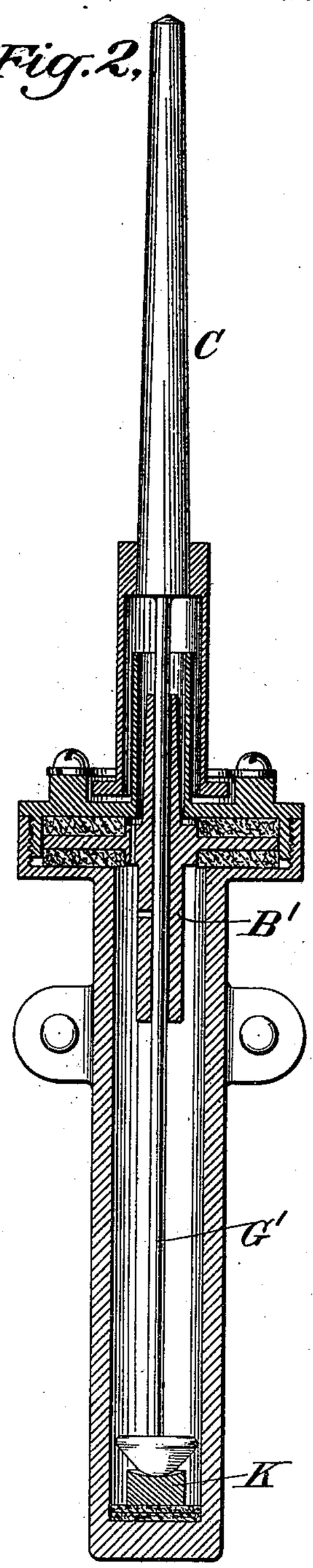
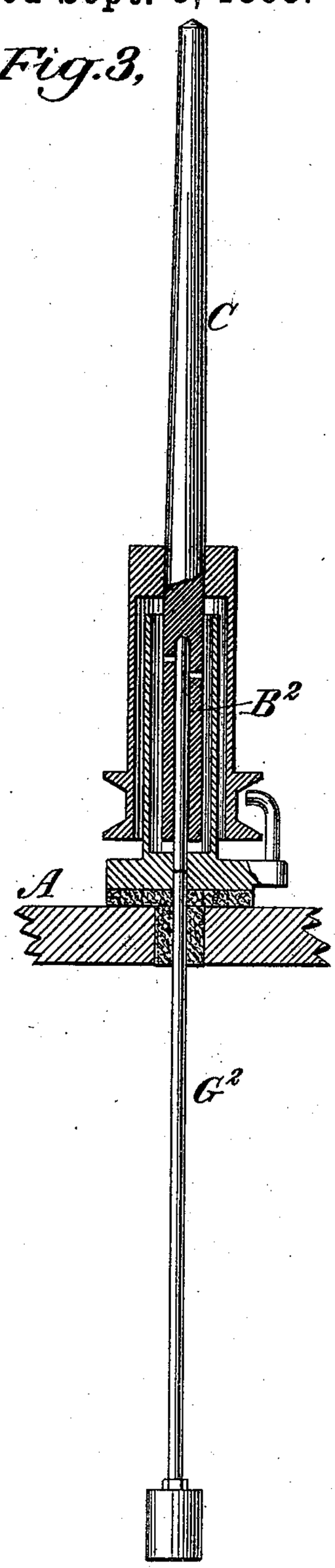


Fig. 3,



Witnesses:-

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By Clarence Rutgers Attorney

UNITED STATES PATENT OFFICE.

HENRY D. KLOTS, OF NEW YORK, N. Y.

SPINNING-SPINDLE.

SPECIFICATION forming part of Letters Patent No. 545,590, dated September 3, 1895.

Application filed December 10, 1894. Serial No. 531,351. (No model.)

To all whom it may concern:

Be it known that I, HENRY D. KLOTS, a citizen of the United States, residing in the city, county, and State of New York, have invented a certain new and useful Improvement in Spinning-Spindles, of which the following is a specification.

My invention relates generally to the art of spinning silk or other filaments by means of bobbin-holding spindles revolved at a high rate of speed; and it has for its particular object to prevent injurious vibration of the spindle due to an unbalanced load. I attain this end primarily by placing the spindle in vibratory communication with a vibratory body tuned to vibrate at a lower or widely-different rate from that at which the spindle rotates and of a moment sufficient to overpower the vibratory moment of the spindle, so that the vibrations set up in the spindle in accord with its rotation under an unbalanced load will be transmitted to the vibratory body, which, vibrating at variance with the spindle and being of greater moment than the same, will oppose, overpower, and thus completely neutralize the vibrations in the spindle. I accomplish this more specifically by mounting the spindle-bearing yieldingly on the spindle rail or support by means of metallic or non-metallic cushions or by any other well-known or approved mode, and arranging a spring to be carried by the yielding spindle-bearing or otherwise placed in vibratory communication with the spindle, said spring being loaded or otherwise designed to vibrate at a rate widely different from or lower than the rate of rotation and vibration of the spindle, and to be of a moment greater than the vibratory moment of the spindle, so as to oppose and overpower the vibrations of the spindle as before stated.

The mode in which I practice my invention is set forth in detail hereinafter, reference being had to the accompanying drawings, forming part of this specification, in which corresponding parts are designated by similar letters of reference in all the figures.

Figures 1, 2, and 3 are sectional elevations of different forms of spinning-spindles, illustrating some different modes of carrying my invention into effect.

In Fig. 1, A designates a spindle-rail, B a combined bolster and step bearing mounted yieldingly on the rail, and C the spindle, the blade of which is here shown constituted with a flexible portion D intermediate the bobbin-holding portion E and bearing portion F, to take up the local vibration in the spindle and to co-operate with the yielding bearing B in preventing vibration, as described in my prior Letters Patent No. 501,792, issued July 18, 1893. Such a yielding bearing or flexible blade does not usually "prevent" vibration due to an unbalanced load, but rather yields to it and hinders its transmission elsewhere. I now actually prevent the vibration by communicating thereto the vibrations of a body of sufficient moment and of such a nature as not to vibrate in unison with the spindle. Thus in this instance I rigidly attach to the lower end of the yielding bearing B a depending rod G, of resilient metal, which I additionally load by means of a mass H at its lower end in such manner that the rate of vibration of the body composed of the spring G and mass H will be greatly below that of the rotation and vibration of the loaded spindle C and its moment of vibration greater than that of the loaded spindle, so that the vibrations of the spindle communicated to the spring G through the yielding bearing will be effectually overpowered and neutralized by the slower vibration of the said spring.

In practice I find that in starting this spindle, as soon as the rate of rotation and vibration thereof exceeds the first or whole note of the spring G all vibration will cease until the rate of rotation and vibration of the spindle accords with the second note or "harmonic" of the spring G, when the vibration will be set up momentarily until that period is again exceeded, when all vibrations will again cease, and so on. When the higher harmonics, however, of the spring accord with the rate of vibration of the spindle, the period of vibration or note of the spring is so high that it will not be affected by the spindle, which will then continue free from vibration.

In Fig. 2 I have illustrated another way of performing my invention, the spindle-blade being in this instance itself thinned and prolonged below the bolster-bearing B′ to form the neutralizing-spring G, the step-bearing K being independent of the bolster-bearing B′.

In Fig. 3 I have illustrated still another mode of performing my invention, the spindle in this instance having an internal bearing B^2, to which the neutralizing-spring G^2 is rigidly connected.

While I attain the best results with a spindle having a flexible portion D, as herein represented, I perform my invention also with a rigid spindle, the vibrations of which are neutralized by the same method.

In each of the examples of my invention (shown in Figs. 1, 2, and 3) it will be seen that the antivibrating spring G, G′, or G^2 is rigidly held at its upper end by the spindle-bearing, either by being rigidly attached thereto, as in Figs. 1 and 3, or by forming an extension of the rigidly-held, though rotatable, spindle-blade, as in Fig. 2, so that the vibrations or oscillations of the spindle-bearing on its yielding mounting are in each case imparted to the upper end of the spring G, G′, or G^2. The lower end of each of the antivibrating springs G, G′, or G^2, is, however, loose so as to be free to vibrate in accordance with its own natural period of vibration, the tube and step-bearing exampled in Fig. 2 not interfering with this limited lateral movement, and thus the vibrations or oscillations imparted by the yieldingly-mounted bearing to the upper end of the antivibrating spring G, G′, or G^2 set up the natural vibrations of said spring, which, being at a different rate from and of a greater strength than the vibrations of the spindle and its bearing, oppose and effectually neutralize said vibrations. It is further evident that in the example of my invention shown in Fig. 3 the thinned portion of the internal spindle-bearing B^2 between the lower end of the spindle and the base-piece serves as well as, although somewhat differently from, the spring D in Fig. 1 as a flexible spring connection to transmit the local vibrations of the bobbin-holding portion of the spindle to the portion of the spindle-bearing mounted yieldingly on the rail.

I claim as my invention—

1. The combination, with a spindle rail, a spindle, and its bearing mounted yieldingly on the rail, of an anti-vibrating spring held rigidly at one end by the spindle bearing so as to partake of the vibratory movements thereof on its yielding bearing, but at its other end loose and free to vibrate laterally in all directions in accordance with its own period of vibration.

2. The combination, with a spindle rail, a spindle, its bearing mounted yieldingly on the rail, and a spring interposed between the bobbin-holding portion of the spindle and the portion of the bearing mounted yieldingly on the rail, of an anti-vibrating spring held rigidly at one end by the spindle bearing, but its other end loose and free to vibrate laterally in accordance with its own period of vibration.

In testimony whereof I, the said HENRY D. KLOTS, have hereunto set my hand, in the city of New York, this 28th day of November, 1894.

HENRY D. KLOTS.

In presence of—
GURDON PENDLETON, Jr.,
MARC WIERS.