May 25, 1937. J. C. A. VICQ 2,081,416

DEVICE FOR PREVENTING BALLOONING IN SPINNING

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Fig. 1.

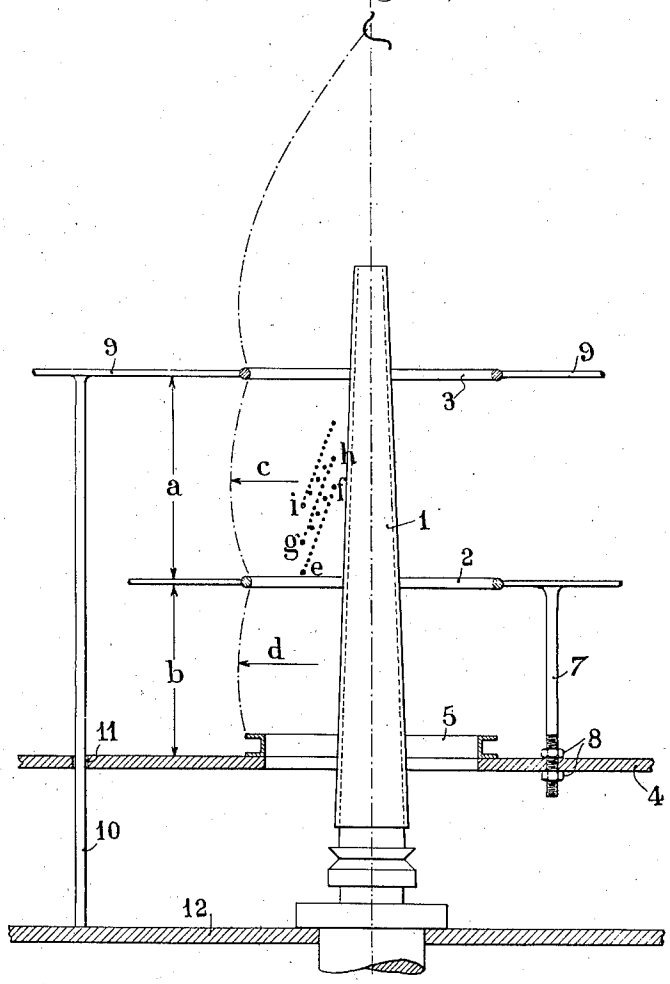
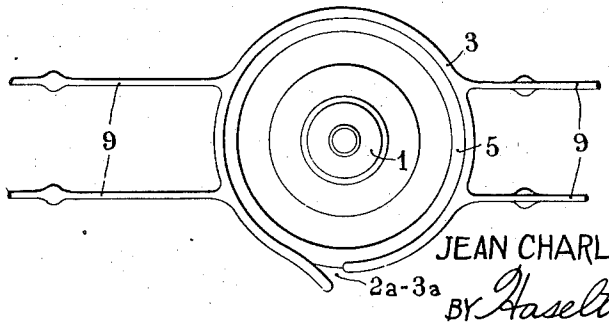


Fig. 2.



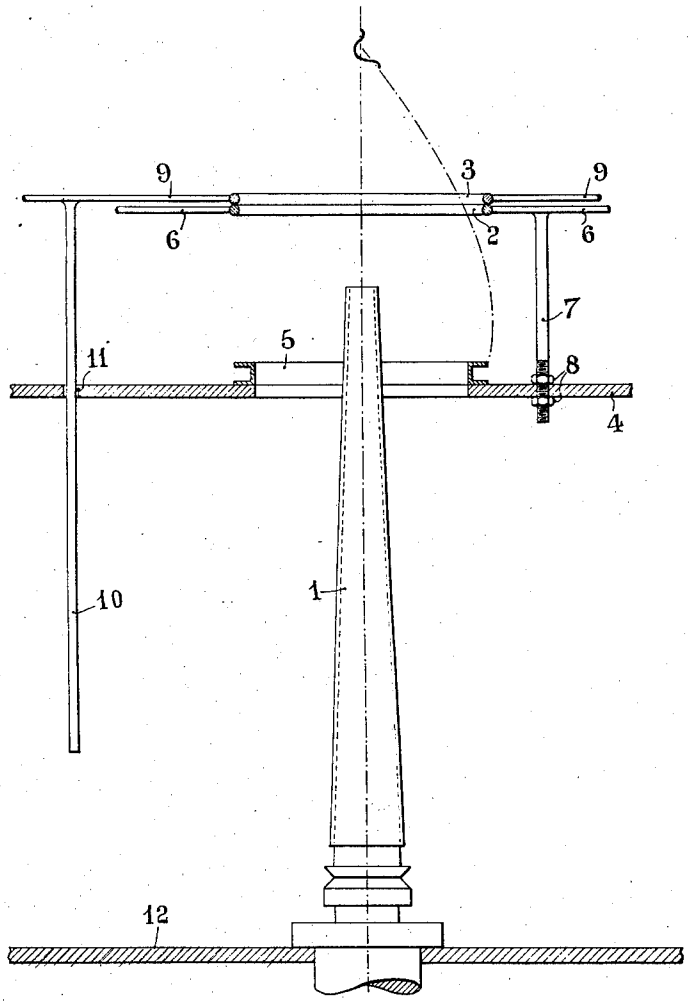
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Fig. 3.



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DEVICE FOR PREVENTING BALLOONING IN SPINNING

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3 Claims. (Cl. 118—11)

During the operations for the manufacture of threads by means of continuous spinning frames, a so-called "ballooning" phenomenon occurs, which is produced by centrifugal force acting on the threads receiving a rapid movement of rotation and which often causes them to break, particularly if relatively fragile, threads of high density are under consideration, such as asbestos threads for instance.

For avoiding this breaking, use is made of anti-ballooning devices of various shapes. All these anti-ballooning devices constituted, for each spindle, by a member secured on the ring rail, guide the threads only on a very small portion of their revolution about the spindle. Moreover, the path followed by a point of the thread, is not in general tangent to the surface of the anti-ballooning device receiving the thread. The thread is not guided; it strikes the anti-ballooning device and these shocks produce ruptures, or, in any case, are prejudicious to the quality of the thread.

The object of the present invention is to provide a device preventing the ballooning phenomenon by guiding the thread on nearly the totality of its revolution, this guiding action varying during the formation of the bobbin so as to rationally adapt itself to the various phases of the formation of the bobbin. By means of this device, the speed of the spindles can be considerably increased without risk of rupture and damage.

This device is preferably provided, for each spindle, with two annular guides concentric with the axis of the spindle and vertically movable, one of them being secured to the usual ring rail on which the traveller-carrying ring is fitted, and being located at an adjustable distance above this ring rail, and the other guide being placed above the preceding one and can sometimes be maintained by a fixed support at a minimum level relatively to the spindle, and sometimes be lifted by the first guide when the ring rail sufficiently rises.

The diameters and positions of these guides are so determined that the thread is prevented by the latter from forming under the action of centrifugal force an arc of too great an amplitude and too far away from the spindle; it results therefrom that the stress to which the thread is subjected, which is proportional at every point to its distance from the axis of rotation, is much reduced and does not risk breaking this thread.

Each of the annular guides is obliquely or tangentially open or slotted at a point of its periphery, in order that the thread may be conveniently and rapidly inserted in the guide. Notwithstanding the presence of these gaps, the rotating thread is not subjected to shocks dangerous for its resistance and prejudicious to its quality, even when the speed is considerable.

A form of carrying out the subject matter of the present invention is illustrated, by way of example only, in the accompanying drawing.

Fig. 1 is a vertical section of the guides surrounding a spindle.

Fig. 2 is a plan view of the upper guide.

Fig. 3 is an elevation showing a position of the guides when the ring rail is lifted.

The device illustrated comprises, about each spindle 1, two anti-ballooning guides 2 and 3 each constituted by a circular horizontal ring having a gap 2*a* or 3*a* for the passage of the thread; this ring can be made for instance of a steel wire having a diameter of 4 millimeters.

The lower guide 2 is secured to the ring rail 4 which supports the traveller-carrying ring 5.

In practice, the guides 2 concentric with a series of spindles will preferably be rigidly connected together by transverse wires 6 welded to the same, and they will be connected at intervals to the balance 4 by screw threaded rods 7 and nuts 8, so that the distance of these guides above the ring rail can be easily adjusted. Four of these rods can be sufficient for carrying for instance a group of six guides 2, so that they will not be cumbersome and will not cause any hindrance.

The upper guides 3 are also connected in groups by means of transverse wires 9 and they can be supported at intervals by vertical rods 10 welded to these wires, freely passing through holes 11 in the balance 4 and bearing on the spindle-carrying beam 12.

The operation is as follows:

When the ring rail is in its lowermost position (Fig. 1), the guide 3 is located at the maximum distance *a* above the guide 2, the distance *b* of which above the ring rail 4 remains constant once it has been adjusted. These distances *a* and *b* are experimentally determined so that, for a thread of given density and resistance and for a given speed of rotation, the ballooning *c* or *d* is limited to a value non-dangerous and non-prejudicious to the quality of the thread. In proportion as the ring rail rises, during winding on, the distance *a* decreases. In general, the winding on is effected in rising layers such as *e f*, *g h*, etc.; the ring rail rapidly lowers, to a smaller extent, after the formation of these layers, the

winding on producing, during these descents, only a few turns *f g*, *h i*, etc.

From a certain position of the ring rail, the guide **2** lifts the guide **3**, then it allows it to rest again by its rods **10** on the beam **12**. When the balance is sufficiently lifted for forming the top of the bobbin, the guide **3** finally constantly rests on the guide **2** continuing to alternately move up and down. During all these phases of the winding on operation, the distance between the guides varies between *a* and zero, whilst the distance *b* remains constant, and the positions of the guide relatively to the spindle and to the traveller always remain such that ballooning is suitably limited.

At each revolution of the thread within the guides, this thread passes on the gaps **2***a* and **3***a*, but, owing to the small width of the latter and to the rounded shape of the ends of the guides, no shock and stress capable of being prejudicious to the quality of the thread is produced.

It is to be understood that the means for securing and supporting the guides, their conformation as well as their relative dimensions can be varied without departing from the scope of the invention, and that the device described is applicable to all kinds of continuous and high speed spinning frames, whatever may be the nature of the spun threads.

I claim:

1. In a spinning machine, having vertical spindles rotating at a high speed on a stationary spindle-carrying beam and on which a thread winds, the combination of a vertically movable ring-rail, means for raising and lowering said ring-rail, a traveller-ring concentric to the corresponding spindle and mounted on said ring-rail, a lower anti-ballooning ring connected to said ring-rail and arranged at a certain distance above said ring-rail, upper anti-ballooning rings arranged above said lower anti-ballooning ring and having the same diameter as said lower anti-ballooning ring, said upper anti-ballooning rings being arranged for free vertical movement, to be raised by said lower anti-ballooning ring and to fall back under the action of the gravity.

2. In a spinning machine as claimed in claim 1, the combination of a lower anti-ballooning ring rigid with said ring-rail, of other anti-ballooning rings located above said lower anti-ballooning ring and independent from said ring-rail, an abutment fixed in the vertical direction for each of said independent anti-ballooning rings, each independent ring being arranged for freely coming to rest on the corresponding abutment, said ring rigid with the ring-rail and said independent rings being arranged relatively to each other in such a manner that said independent rings are lifted by said ring rigid with said ring-rail in proportion as the latter rises.

3. In a spinning frame as claimed in claim 1 the combination of a lower anti-ballooning ring rigid with said ring-rail and of other anti-ballooning rings located above said lower ring and independent from said ring-rail, each of said independent rings being provided with a downwardly extending rod, these rods being arranged for freely coming to rest on said spindle-carrying beam.

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