

May 15, 1928.

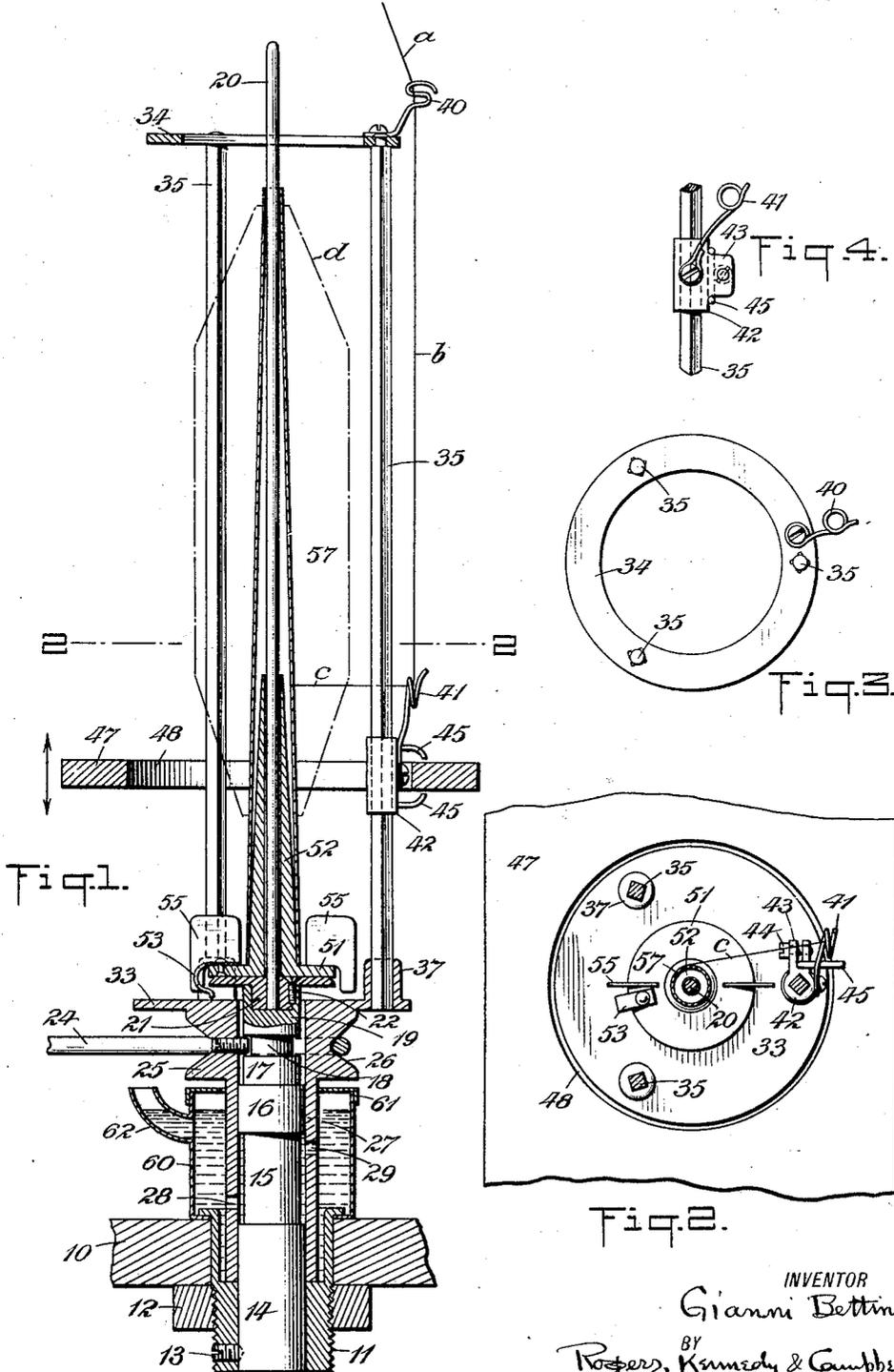
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SPINNING DEVICE AND METHOD

Filed Aug. 12, 1925

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

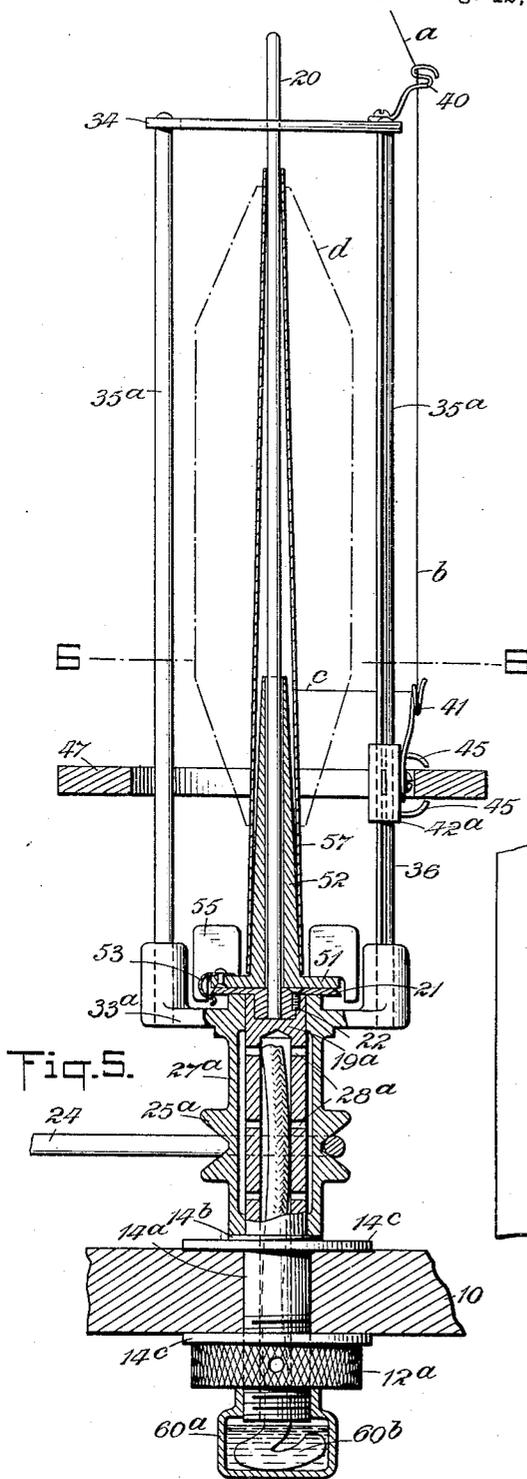


Fig. 5.

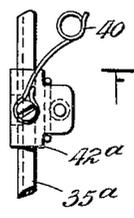


Fig. 8.

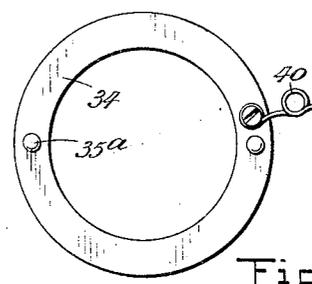


Fig. 7.

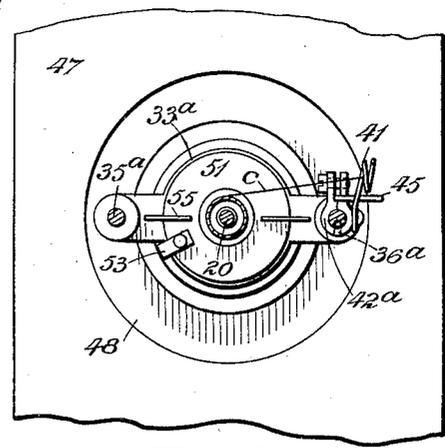


Fig. 6.

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# UNITED STATES PATENT OFFICE.

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SPINNING DEVICE AND METHOD.

Application filed August 12, 1925. Serial No. 49,792.

This invention is a novel spinning device and method, having to do with the twisting and winding of yarns, including any fibrous materials or strands such as cotton, wool, silk or artificial silk. The main object of the present invention is to provide a means and method of continuous spinning, wherein the twisting and winding proceed simultaneously, and in which the speed and production may be increased substantially beyond commercial speeds heretofore used, namely, by insuring uninterrupted continuity of operation by minimizing strain and breakage of the yarn, and avoiding other factors tending to limit the speed; with this invention a speed of 12,000 R. P. M. or higher is attainable. Other objects are, to afford uniformity of twisting action and therefore a better product, to eliminate the objection of ballooning of the yarn between the supply or rollers and the winding point, and to enable the same device to be used for winding upon tubes or spools of small as well as larger diameter. The present invention substantially combines the operative advantages of various prior spinning means while eliminating the respective disadvantages thereof; it is such that it is readily adapted to be applied to existing machines, to replace the usual spinning devices, without alteration; and it is simple, durable and inexpensive.

Other objects and advantages of the present invention will be explained in the hereinafter following description or will be apparent to those conversant with the subject.

To the attainments of the objects and advantages referred to the present invention consists in the novel spinning mechanism and method and the novel features of combination, arrangement, construction and operation herein described or illustrated.

In the accompanying drawings showing an illustrative embodiment of the invention, Fig. 1 is substantially a central vertical cross section of sufficient of the mechanism to enable the features of the present invention to be disclosed. Fig. 2 is a top plan view partly in section taken on the line 2-2 of Fig. 1. Fig. 3 is a top plan view of the parts above the line 2-2 of Fig. 1. Fig. 4 is a right-hand elevation of certain details seen in Fig. 1.

Fig. 5 is a view similar to Fig. 1 showing

a modified construction; and Figs. 6, 7 and 8, corresponding with Figs. 2, 3 and 4, show the said modification.

In the following description there will first be described the stationary parts, among which is a central vertical rod about which the receiving element, spool or tube is placed, the usual driven spindle being herein dispensed with. Then will be described the positively driven elements of mechanism, including the revolving guide eyes; and then the means for traversing these longitudinally of the cop or bobbin. Then will be described the loose or free running parts which hold and control the tube and bobbin, which latter, with this invention, is actuated solely by the pull of the yarn, controlled by retarding means or drag to be described. Finally will be described the lubricating system.

Rigidly secured to a frame part 10, usual to such machines, is shown an upright threaded socket piece 11, cupped at its upper end, and held below the frame part by a nut 12. Held rigidly within the bore of the socket piece by a screw 13 is shown an upright central post 14. This post at an intermediate point is provided with a section 15 of reduced diameter forming an annular oil recess, and above this is a full diameter section 16, then a reduced diameter section 17 formed with a groove 18, above which is a cupped upper extremity of the stationary post. Instead of a driven or rotatable central spindle, with its attendant disadvantages, this invention employs a fixed central rod 20, which forms a bearing and support for the spool, tube or other removable receiving element. The stationary rod 20 is brazed into a flanged base piece 21 which in turn is secured against rotation in the cupped extremity 19 of the main post 14 by means of a connecting screw 22.

Power may be derived from a fast running belt 24 operating on a pulley 25 having a belt groove 26, and the remainder of the driven parts may comprise the following. The driven pulley is provided or formed with a downwardly extending sleeve 27 which bears and rotates upon the sections 16 and 14 of the interior fixed post. However, the portions 14 and 16 may be replaced by sleeves of bearing metal. The bearing sleeve 27 is shown as having a lower oil hole 28 and an

upper oil hole 29 whereby the oil vessel to be described may feed into the recess 15 located between the bearing sections 14 and 16 of the main post.

5 The rotary pulley 25 is shown as formed or provided with a rotary disk 33 at its upper side. This rapidly driven part forms the lower of two opposed rotary disks or rings, the upper one being the annular ring 10 34, and these two members being interconnected by stiff rods 35, forming with the elements 33 and 34 a light traversing frame capable of very high speed of rotation. In 15 Figs. 1, 2 and 3 are shown three of the frame rods 35, one of which acts as a traversing guide, these being square in cross-section, for strength and ability to cut through the air, and this form serves to guide properly the slides moving along one of them. The 20 lower ends of the traverse frame rods or guides 35 may be secured in sockets 37 formed integrally at the periphery of the rotary disk 33.

25 The yarn is shown descending, in twisted condition, at *a*, from the usual rollers or other supply, then through the usual fixed upper guide eye adjacent the rollers. The twisted yarn *a* is shown passing through a 30 fast revolving guide eye 40 mounted directly on the rotary ring 34 at the upper end of the traverse frame. From this point the yarn descends at *b* in a substantially vertical direction. The described arrangement is one of the valuable features of the present in- 35 vention. Owing to the fixed length or distance between the yarn supply point and the guide eye 40 the rate and degree of twisting is always uniform notwithstanding the traversing movement to be described in lay- 40 ing the yarn upon the cop. The distance from the supply to the guide eye 40 and the definite rate of driven rotation of the guide eye, determine the degree of twisting, which thereby may be maintained quite uni- 45 form. The yarn passes alternately around the bars of the eye 40, arranged to deflect the yarn and so impose enough drag to insure the described action. Owing to the short length from the supply to the guide 50 eye 40, which is on the ring 34, at the top of the device, and the higher tension due to the high speed, the tendency to ballooning is eliminated.

55 From the guide eye 40 the yarn *b* passes downwardly to a guide eye 41, which is moved vertically, or longitudinally of the spool, during the winding. The yarn at *c* passes from the eye 41 directly to the spool. The ultimate form of the built-up cop or 60 bobbin may be as indicated at *d*. The twisted strands, in a uniform condition as stated, are laid peripherally on the cop by the rotation of the guide eye 41, and without suffering any strain, so that the usual 65 troublesome breakage at this point is practi-

cally eliminated. To an extent this action resembles the winding of a thread upon a spool manually by allowing the thread to slip through the thumb and finger, which 70 apply a certain tension on the thread, but without strain, as these move progressively around the spool, while the longitudinal traversing action builds up the cop of de- 75 sired form. The guide eye 41 is shown mounted on a small and light carriage or slider 42 which is capable of sliding longi- 80 tudinally on one of the traverse guides 35 to give the desired traversing motion. The slider 42 is shown as formed with a pair of ears 43 drawn together by a screw 44 and 85 serving as a clamp for a double finger 45 which straddles, and thus engages above and below, a suitable traversing means, which may be the usual one consisting of a block or plate 47 having a circular recess 48 sur- 90 rounding the revolving parts, and suitably actuated in any well known manner to move the slider and guide eye longitudinally of the spool while laying the yarn in the de- 95 sired form.

As stated, there is no driven spindle here- 100 in, but the spool and bobbin are arranged to be loose or free running, and are advanced only by the pull of the yarn, but controlled by a suitable retarding means, which there- 105 by effects a differentiation in speeds and insures both an effective twisting and a regular, tight winding of the yarn. Thus a base 51 of circular form is shown, above which 110 stands up a conical support for the spool, tube or bobbin. These two parts surround the central rod 20 and are loose or free run- 115 ning, and bear lightly upon the flanged base piece 21 which supports the central rod. In order to keep the parts in relation a hold- 120 down finger 53 is shown mounted on the base 51 and extending under the flange of the support 21.

As a retarding means to prevent the spool and bobbin rotating at the full speed of the 125 traversing frame I prefer to employ a plurality of wings 53, in symmetrical relation, these being shown mounted radially on the free running base 51, and of such size and 130 shape that air resistance effects a satisfactory retarding of the rotation. This wing de- 135 vice or butterfly is found to be fairly uniform and satisfactory in operation, and the re- 140 tarding effect can be of predetermined amount by selecting wings of proper size and arrangement.

The tube or spool 57 or other receiving 145 element for the yarn is shown as slightly conical, as is usual in the art, the tube resting snugly down upon the free running base 51 and surrounding the conical tube support 150 52. It is one advantage of the present invention that a tube of the smallest diameter can be used and the bobbin wound satisfac- 155 torily, irrespective of the distance from bob-

bin surface to eye 41; and larger tubes can readily be used by means of interchangeable supporting members 51, 52.

A circular oil vessel 60 is shown surrounding the rotary sleeve 27, this vessel having a cover 61 and a filling spout 62. The oil is kept in motion by the rotation of the sleeve, and it is found that pressure and flow through holes 28, 29 are produced in a manner to keep the running surfaces well lubricated.

The described combination of elements gives very satisfactory, uniform and efficient operation, permitting high speeds as stated. Many well known adjuncts are to be understood. Thus, for example, the yarn supply rolls or other supply means may be regulated in a usual manner to determine the rate of supply or paying out the untwisted yarn, thereby to control the complementary winding and twisting operations and the operative effect of the atmospheric retarding means.

The modification of Figs. 5-8 contains features not in Figs. 1-4. The central fixed post 14<sup>a</sup> is fitted directly in the frame part 10 by a rib 14<sup>b</sup> and collars 14<sup>c</sup>, locked by a nut 12<sup>a</sup>. The cupped upper end 19<sup>a</sup> of the post receives the fixed rod 20 as in Fig. 1. The drive pulley 25<sup>a</sup> is differently shaped, but comprises a sleeve 27<sup>a</sup> rotating on the central post, and oil holes 28<sup>a</sup>, and a rotary disk 33<sup>a</sup> at the upper end. The top ring 34 is connected to 33<sup>a</sup> by only two frame rods 35<sup>a</sup>, of circular section, held below in sockets 37<sup>a</sup> on 33<sup>a</sup>. One of the rods 35<sup>a</sup> is grooved at 36 to receive a pin 36<sup>a</sup> projecting from the slider 42<sup>a</sup>. The oil vessel 60<sup>a</sup> is at the foot of post 14<sup>a</sup>, and a wick 60<sup>b</sup> conveys the oil to the holes 28<sup>a</sup>. The remaining elements may be substantially as in Figs. 1-4.

In the two forms the central rod 20, which has been called non-driven, is shown fixed, but might be free, as is the holder or cone 52, for example by removing the screw 22, or by brazing the rod, not to the base 21, but to the cone 52; in which case the rod will turn with the cone and tube, resisted by the wing device.

Having thus described a preferred embodiment of the principles of my invention, I desire to explain that many matters of design, arrangement, combination and detail may be variously modified without departing from the novel principles; therefore I do not intend to limit the invention to such matters except to the extent set forth in the appended claims.

What is claimed is:

1. A device for twisting and winding comprising a rotary traverse frame having a plurality of upright rods and a member connecting them at the top, a yarn guide at the upper part of said frame, a slider movable on one of said rods having a guide for

guiding the yarn to the bobbin, a non-driven central rod, a freely rotatable concentric holder for the receiver, and atmospheric means for retarding the free rotation of said holder and receiver.

2. A device for twisting and winding comprising a rotary traverse frame having a plurality of upright rods and a member connecting them at the top, means at the bottom of said frame for driving it, a yarn guide on said ring, a sliding member on one of said rods, adapted to traverse the frame and guide the yarn to the receiver; a fixed central rod, a rotatable member turning loosely on said rod and carrying the receiver, and means operating on said member to retard the rotation of the receiver.

3. A device for twisting and winding comprising a rotary traverse frame having a plurality of upright rods and a concentric ring connecting them at the top, a slider movable on one of said rods and carrying a yarn guide, exterior means for traversing said slider along its rod to form the cop, and a finger or engaging part on the slider engaging with said exterior means.

4. Spinning mechanism comprising a rotary driven traverse frame, a traverse member thereon, a fixed rod adapted to engage within the receiver, a free running support for a receiver, and means for retarding said support.

5. Spinning mechanism comprising a rotary driven traverse frame, a traverse member thereon, a central rod adapted to engage within the receiver, a free running support for a receiver, and atmospheric means for retarding said support.

6. Spinning mechanism comprising an upper guide, means for holding a receiver for the yarn, means for revolving said guide around the yarn receiver while maintaining a substantially uniform thread length between the yarn supply and guide, a lower guide, and means for effecting traversing movements of the lower guide.

7. Spinning mechanism for twisting yarn and winding it upon a spool comprising a yarn guide and a whirling traverse frame along which the yarn guide is reciprocated to build up the cop, the spool being free and caused to rotate only by the pull of the yarn being wound upon it while subject to air-blade retarding action and the traverse frame carrying also a peripheral upper yarn guide imposing tension upon the advancing yarn thereby tending to confine the twisting action to the fixed length of yarn extending slantingly from the central overhead supply point to the whirling upper guide.

8. Spinning mechanism for twisting yarn and winding it upon a rotary spool comprising a yarn guide and a whirling traverse frame along which the yarn guide is reciprocated to build up the cop, the spool being

neither driven nor reciprocated, but free and caused to rotate only by the pull of the yarn being wound upon it while subject to an appropriate retarding action, and a central rod 5 which is not driven, the rotary spool surrounding the central rod; the spool lower end being fitted upon a loosely rotary support having retarding means, while the spool upper end bears upon the central rod.

10 9. Spinning mechanism for twisting yarn and winding it upon a spool comprising a yarn guide and whirling traverse frame along which the yarn guide is reciprocated

to build up the cop, and an upper yarn 15 guide, said traverse frame comprising a top ring and a bottom support, connected by upright bars, one of which is the track for the reciprocating yarn guide, the upper yarn guide mounted on the top ring and the spool 20 being neither driven nor reciprocated, but free and caused to rotate only by the pull of the yarn.

In testimony whereof, I have affixed my signature hereto.

GIANNI BETTINI.