999,616.

G. E. WISSMANN.

JACK WINDING MACHINE.

APPLICATION FILED OCT. 28, 1908.

Patented Aug. 1, 1911.

3 SHEETS—SHEET 1.

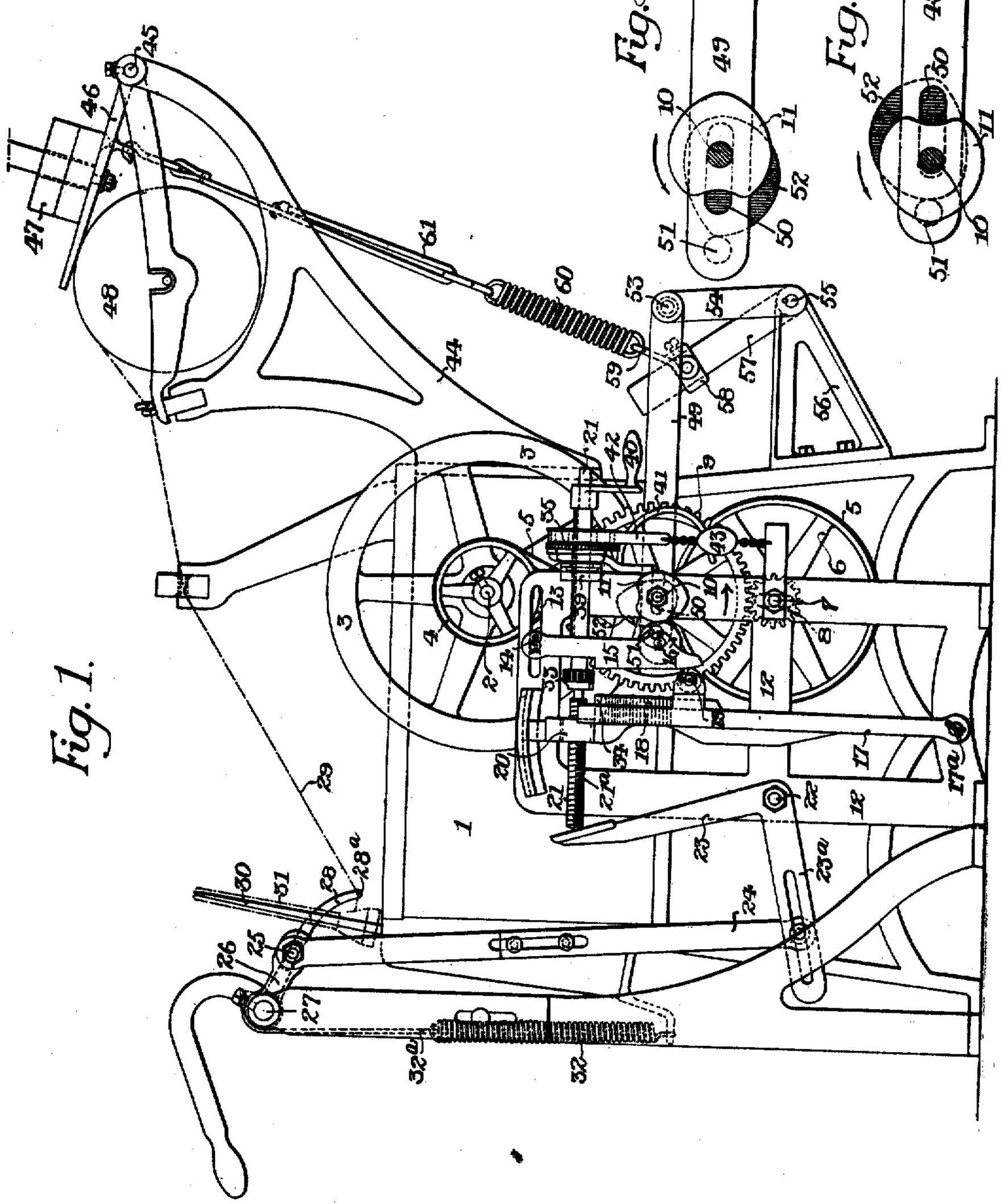

Fig. 1.

Fig. 5.

Fig. 4.

Witnesses.—
Willis A. Burrows
Augustus R. Hoppes

Inventor.—
George E. Wissmann.
by his Attorneys.—
Howson & Howson

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3 SHEETS—SHEET 2.

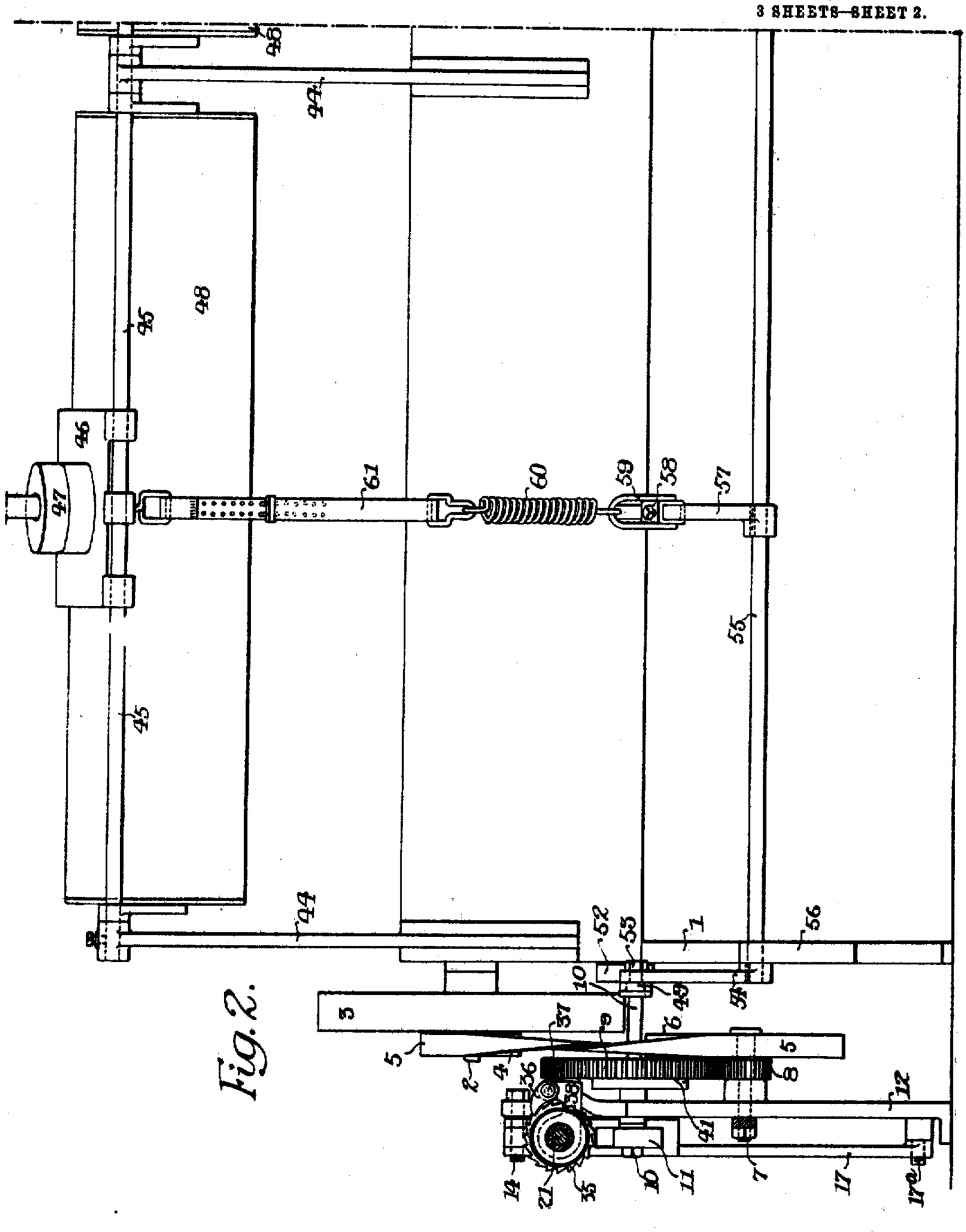

Fig. 2.

Witnesses:-
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3 SHEETS—SHEET 3.

Fig. 3.

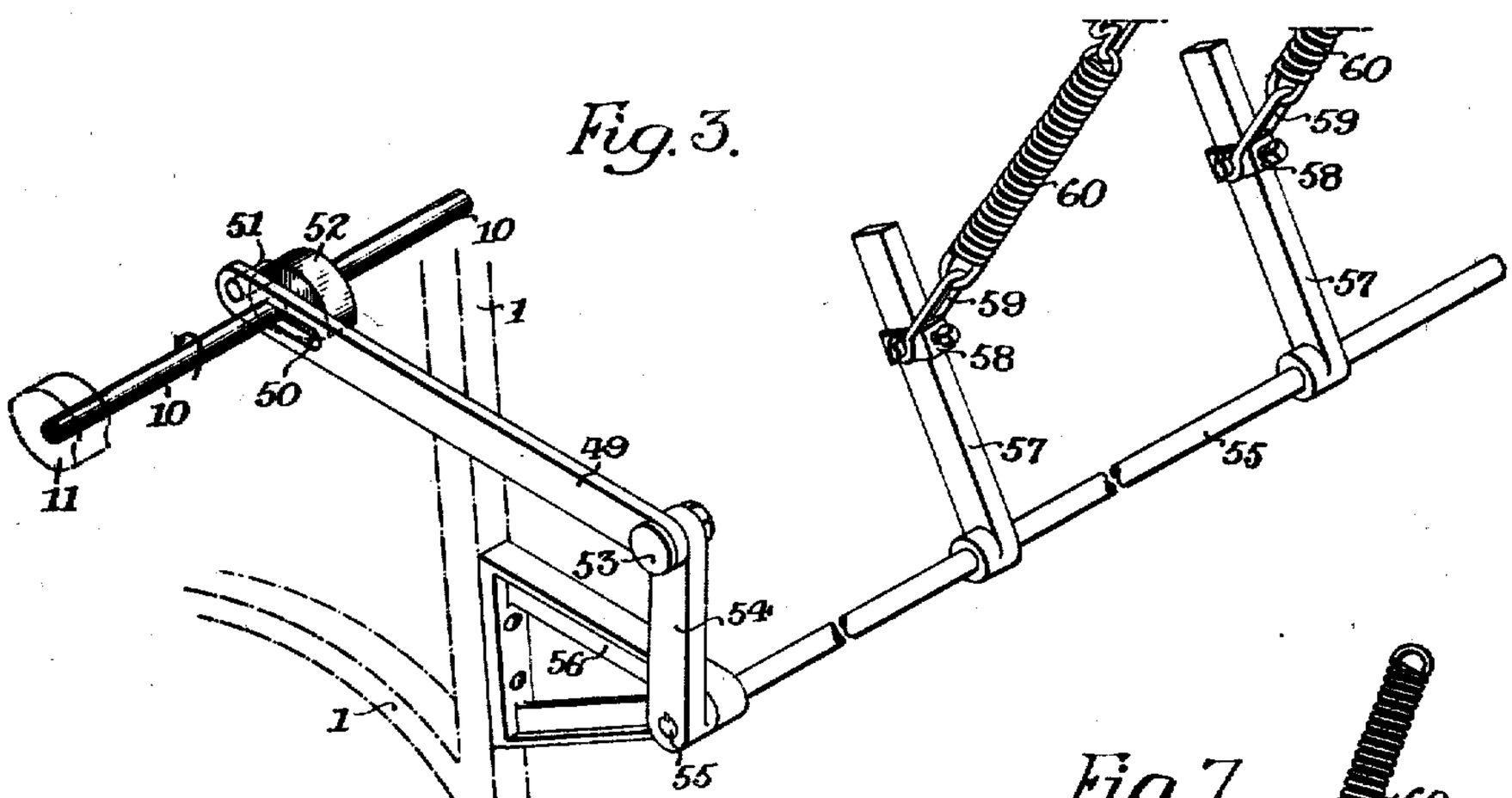


Fig. 6.

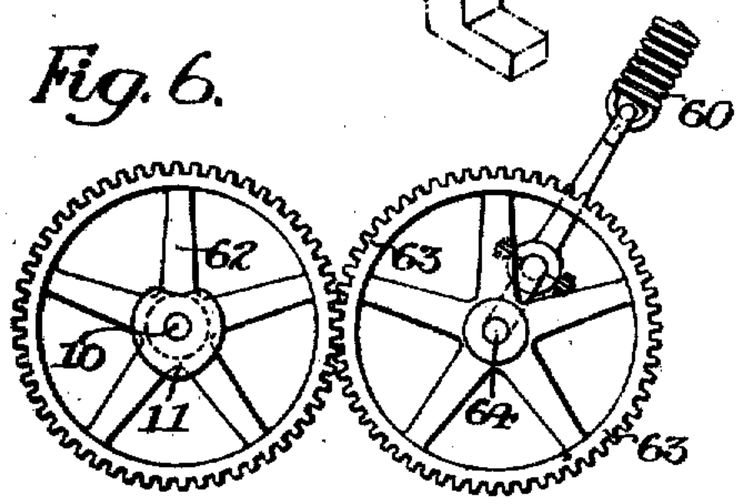


Fig. 7.

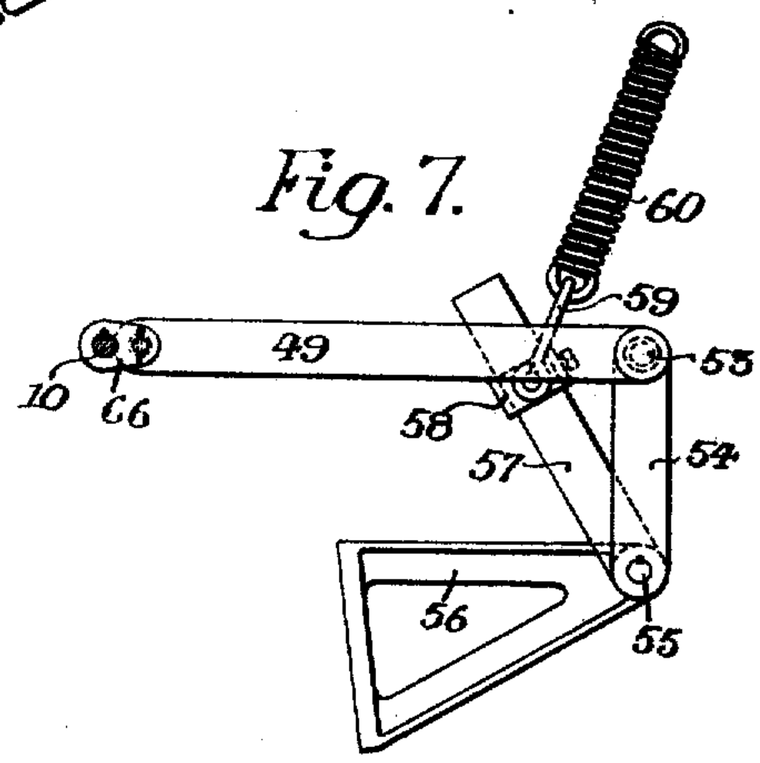


Fig. 8.

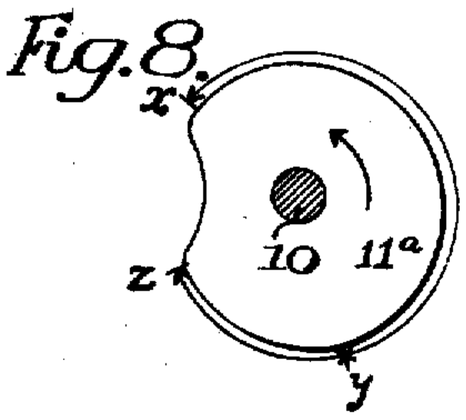


Fig. 10.

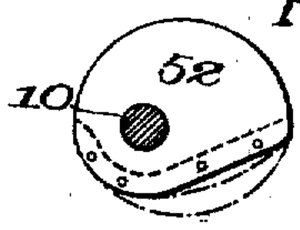
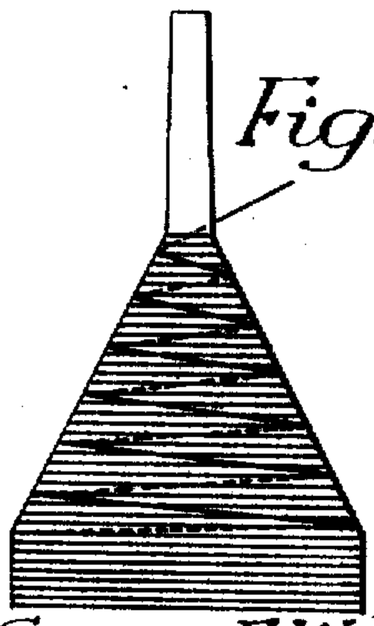


Fig. 9.



Witnesses-
Wills A. Burrows
Augustus B. Coppes

Inventor
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UNITED STATES PATENT OFFICE.

GEORGE EUGENE WISSMANN, OF PHILADELPHIA, PENNSYLVANIA.

JACK-WINDING MACHINE.

999,616. Specification of Letters Patent. Patented Aug. 1, 1911.

Application filed October 28, 1908. Serial No. 459,880.

To all whom it may concern:

Be it known that I, GEORGE EUGENE WISSMANN, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Jack-Winding Machines, of which the following is a specification.

My invention relates to bobbin winding machines of the type known as jack winders, and one object of said invention is to provide an attachment for such a machine for causing the bobbins to be wound hard and even throughout.

Owing to their having to be shot or thrown across a loom, bobbins are wound in a series of conical layers in order to allow the yarn to run off easily and it is for the winding of a bobbin of this nature that my invention is particularly adapted.

Heretofore on jackwinding machines it has been difficult to obtain a "hard wound" or "even wound" bobbin from all classes of yarn, for the reason that the ends were all taken from beam spools having no drive other than that caused by the pull of the yarn as it was wound on the bobbins. This pull was greater and the beam spools had to give off more yarn, when the winding was being done on the larger portions of the cone formation than when the portions of smaller diameter were being wound, and since the speed of the bobbins was constant, the momentum attained by the beam spools when supplying yarn during the winding from apex to the base of the cone formation, caused said spools to give off more yarn than was needed when the winding was being done in the opposite direction. This action resulted in a slacking of the yarn, and the parts of the bobbin wound when the yarn was in this condition were loose and soft. Attempts have been made to remedy this fault by providing yarn "take ups" which operated upon the threads after they left the spools, but it was found that these not only strained the yarn by acting on the individual ends but also created an uneven tension.

My invention, therefore, is devised to avoid these objections and is so constructed as to render possible the winding of yarn of lower grade than it has hitherto been possible to use with any degree of success on the ordinary jack winder.

It is further desired to provide an attachment whereby it is possible to successfully and efficiently form a bobbin having a special winding.

These objects and other advantageous ends I secure as hereinafter set forth, reference being had to the accompanying drawings in which:—

Figure 1, is an end elevation of a jack winding machine illustrating my invention as applied thereto; Fig. 2, is a rear view of a portion of the machine shown in Fig. 1; Fig. 3, is a perspective view of the attachment forming the main part of my invention; Figs. 4 and 5, are side elevations showing certain elements of my attachment in different positions; Figs. 6 and 7, are elevations illustrating modifications of parts of my invention; Fig. 8, is a side elevation of a modified form of a cam which I may employ; Fig. 9, is an elevation of part of a bobbin having a particular winding which is made possible by using the cam shown in Fig. 8; and Fig. 10, is a side elevation of an adjustable cam which may be used as a part of my invention.

In Fig. 1 of the above drawings, 1 represents the main frame of the machine, having a bearing for a shaft 2, to which are keyed the usual fly-wheel 3 and a driving pulley 4. A belt 5 connects this pulley with a second pulley 6 fixed to a shaft 7 mounted in a bearing on an auxiliary frame 12. Also fixed to the shaft 7 is a pinion 8 which meshes with a gear 9 fixed to a third shaft 10. This latter is mounted in bearings in the frames 1 and 12 and has on its end a heart-shaped cam 11. Near the top of the auxiliary frame 12 is a slot 13 through which passes a pin 14 and from this depends a swinging lever 15 having at its lower end a roller 16 which is always in contact with the heart-shaped cam 11. An arm 17, pivoted at 17^a to the frame 12, has slidably

mounted on it a toothed rack 18 and at the lower end of this latter is a roller 19 which always bears against the hanging lever 15. The upper end of the bar 17 has a nut 20 and in this is mounted the threaded portion 21ª of a rod 21 to which is fixed a pinion 33 capable of being brought into engagement with the teeth of the rack 18. Said rod has at one end a handle 40, and there is also mounted on it a ratchet wheel 35 so arranged as to be capable of turning the rod while permitting its longitudinal movement. Pivoted to the frame 12 at 22 is a bell crank lever 23, one arm of which rests against the end of the bar 21, while its other arm is slotted at 23ª for the adjustable attachment of a link 24. The upper end of this latter is connected by a bolt 25 to an arm 26 fixed to a shaft 27 carried in suitable bearings on the frame 1. Fixed at predetermined distances along the shaft 27 are fingers 28 having holes at their outer ends through which passes a guide or feed wire 28ª running the length of the machine and arranged to act on the yarn 29 as it is fed to the bobbins 30 mounted on the rotatable spindles 31. A spring 32 is attached at one end to a strap 32ª wrapped around and fixed to the shaft 27, while its other end is connected to the main frame;—its arrangement being such that it tends to keep the fingers 28 with the wire 28ª in a raised position and one arm of the bell crank lever 23 in contact with the end of the rod 21. A pawl 36 is pivoted at 37 on an arm 38 loosely mounted on the bar 21 between the ratchet 35 and a journal 39 projecting from the frame 12, and a cam 41 is fixed to the gear wheel 9 so as to operate said pawl when this wheel is turned. A retarding strap 42, to which is hung a weight 43, passes around a collar forming part of or fixed to the ratchet 35 in order to prevent a too easy movement of the bar 21. Brackets 44, attached to the main frame, serve to support a shaft 45 to which are attached the usual pressure paddles or shoes 46 weighted at 47, which bear on the upper portion of the yarn on the beam spools 48. A shaft 55, rotatably mounted in brackets 56, has fixed to it an operating arm 54 and to this is pivoted at 53 a horizontally extending bar 49 having a slot 50 through which passes the shaft 10. Fixed to the bar 49 near its slotted end, is a pin 51 placed to be actuated by a cam 52 keyed to said shaft 10 so as to periodically rock the shaft 55 when said cam is turned. The shaft 55 runs the whole length of the machine and has fixed to it, at predetermined distances apart, a series of levers of which one is shown at 57. Each of these levers has an adjustable slide 58 connected through a link 59 to one end of a spring 60 whose opposite end is connected by an adjustable strap 61 to the paddles 46.

The mechanism for rotating the bobbins has been left off the drawings for the sake of clearness.

Before starting the bobbins the rod 21 is rotated by means of the handle 40 until its pinion 33 comes into engagement with the teeth 34 of the sliding rack 18, after which the continued motion of the handle 40 will raise said rack together with the roller 19.

The operation is as follows:—Power is applied in any desired manner to the shaft 2, and the shaft 10 is rotated, through the medium of pulleys 4 and 6, and gears 8 and 9, in the direction indicated by the arrow in Fig. 1. The heart-shaped cam 11 then operates against the roller 16 to swing the lever 15 and rock the arm 17 through the medium of the roller 19, thereby giving the bar 21 a reciprocating motion. The bell-crank lever 23 thus receives a rocking motion due to the continued action of the bar 21 and the spring 32, so that through the link 24, lever 26 and shaft 27 the yarn guide 28ª is caused to have an up and down motion in order to wind the yarn at different heights on the bobbins which are rotated by pulley and belt mechanism (not shown on the drawings); the beam spools 48 being rotated by the pull of the yarn 29 as it is wound on the said bobbins. On each revolution of the shaft 10, the cam 41 on the gear 9 lifts the pawl 36, causing it to partially turn the ratchet 35 and with it the bar 21. Owing to this turning of said bar, the pinion 33 thereon moves downwardly the rack 18 and its roller 19, until this latter finally reaches the position shown in Fig. 1, when the pinion 33 will have slid out of mesh with the rack 18, and the cone building action will have been completed. During this part of the operation of the machine, the cone portion of the bobbins has been formed, for as the roller 19 was lowered, the arm 17 was caused to swing through successively greater arcs, so as to actuate the yarn. The roller 19 now remains in this lowered position, causing uniform movements of the arm 17 until the bobbin is full wound. It will thus be seen that the lead or movement of the yarn up the bobbin is caused by the change of relative positions of the end of the bar 21 and the arm 17; and this change is caused by the rotation of said bar and its resulting movement through the nut on the top of said arm. The cone thus formed (Fig. 1) constitutes the foundation for the winding of the rest of the bobbin, which when finished, consists of a series of conically wound layers.

When the yarn guide is feeding yarn to the conical portion of greatest diameter, the heart-shaped cam is presenting its highest face to the roller 16, and the pin 51 on the bar 49 is resting against the lowest portion

of the cam 52 as shown in Fig. 4. As the heart-shaped cam rotates, the yarn guide rises, feeding yarn in decreasing amounts for each revolution, and at the same time the cam 52 acts upon the pin 51 to move the bar 49. This latter, being connected to the lever 54, partially turns the shaft 55 and moves downwardly the arms 57. Tension is thereby placed on the springs 60 and the paddles 46 are caused to exert an increased pressure upon the yarn on the spools. This pressure continues to increase until the cam 52 has presented its highest face against the pin 51, as shown in Fig. 5, and the parts are so timed that this occurs just as the smallest diameter of the cone is being wound or just before the yarn guides start to move down.

The cam 52 is so designed (as shown clearly in Figs. 1, 3, 4 and 5) that when the winding is started from the apex toward the base of a conical layer, it will allow the quick return of the pin 51; the reason for this action being that while it is not desired that the pressure on the paddles shall be released with great suddenness, it is advantageous for it to be done rapidly, for the reason that each succeeding revolution of the bobbin needs more yarn which should be supplied without any strain.

With the modified arrangement of parts shown in Fig. 6, a gear 62 on the shaft 10 actuates a suitably mounted gear 63 having a crank shaft 64 connected to one end of the spring 60. There may be any desired number of these cranks so timed that they will cause an increasing pressure to be placed on the spools by the paddles 46 when the bobbins are being wound from a greater to a smaller diameter and will diminish such pressure when the winding is being done in the opposite direction.

In the modification of Fig. 7, the crank 66 is rotated by the shaft 10 and operates the bar 49, the lever 54 and the rock-shaft 55, to move the arms 57 as before described.

By my attachment, as shown, in the several views of the drawing, I am able to deliver to the bobbins the amount of yarn needed for each lap or revolution so that it is always at the same tension. This is rendered possible by the springs 60, which constitute an automatic take-up means for gradually decreasing the pressure of the paddles upon the yarn on the beam spools as the volume of yarn thereon decreases, and the mechanism coöperative with the cone building mechanism for exerting a variable pressure upon the yarn on the beam spools through the medium of the said springs.

If the heart-shaped cam be replaced by the cam 11ª shown in Fig. 8 and used with my attachment above described, it is possible to wind a bobbin of the design illustrated in Fig. 9. Such a bobbin has a large number of turns or laps in one direction and but comparatively few turns on the other direction and although its winding is most desirable for certain kinds of weaving, it has not hitherto been practical to wind with the machines known to the art owing to the inability to secure the proper amount of tension on the yarn during the winding of the widely spaced layers.

When the cam 11ª is substituted for the heart-shaped cam 11, the cam 52 should have such a contour as to continue to release the friction on the beam spools while the bobbins are winding the close laps from smaller to greater diameter of the cone formation and change so as to continue to quickly apply the friction on the said beam spools as soon as the bobbins start to wind the widely spaced turns from greater to smaller diameter of the cone formation. The action is as follows:—The slow portion, x to y, of the cam 11ª gradually forces the roller 16 farther away from the shaft 10 for more than one half revolution and lowers the yarn guide fingers slowly; thus allowing each successive lap of yarn to lay close to the preceding one in winding each layer from the smaller to the greater diameter of the cone formation. The quick portion of the cam 11ª, extending from y to z and occupying a comparatively small portion of the periphery, allows the quick return of the roller 16 to its normal position; this causes the yarn guide fingers to attain a rapid upward motion and, as the rotation of the bobbins is constant, the laps of yarn to be widely spaced.

While I have shown in the drawings one wide paddle for each spool, it is obvious that two or more may be used upon each spool with good results. Moreover it is immaterial whether my attachment be used on what are technically known as jack winding machines or on skein winders, as it may be employed on certain of these without material change or departure from my invention.

If it be desired, the cam 52 may be made as illustrated in Fig. 10, so that a portion of its face may be adjusted to vary its action upon the pin 51 and the apparatus connected thereto, the object of such adjustment being to vary the speed at which the pressure exerted upon the yarn is varied from maximum to minimum depending upon the quality and nature of said yarn.

I claim:

1. In a machine for winding a bobbin of varying contour, the combination of the thread guiding and winding mechanism including an operating shaft the yarn spool, a brake operative upon the yarn on said spool, connecting mechanism between said brake and the aforesaid operating shaft whereby the brake pressure is varied to

maintain a uniform tension upon the yarn during the winding operation, said connecting mechanism including an automatically acting device for decreasing the brake pressure as the volume of yarn on the spool decreases, substantially as described.

2. In a jack-winding machine, the combination of the thread guiding and winding mechanism including an operating shaft, the yarn spool, a brake operative upon the yarn on said spool, a cam actuated by rotation of said operating shaft, means for operatively connecting the cam and brake to cause the latter to press on the yarn with varying pressure to maintain uniform tension upon the yarn during the winding operation, the same including an automatically acting device for decreasing the intensity of the pressure exerted by the brake as the volume of yarn on the spool decreases, substantially as described.

3. In a jack-winding machine the combination of thread guiding and winding mechanism including an operating shaft, the yarn spool, a brake operative upon the yarn on said spool, connecting mechanism between said brake and the aforesaid operating shaft whereby the brake pressure is varied to maintain a uniform tension upon the yarn during the winding operation, said connecting mechanism including a spring under tension adapted to be decreased as the volume of yarn on the spool decreases, substantially as described.

4. In a jack-winding machine the combination of thread guiding and winding mechanism including an operating shaft, the yarn spool, a brake operating on the yarn in said spool, mechanism adapted to be reciprocated in a predetermined manner by the rotation of said operating shaft; and a spring operatively connecting, and held under tension between said reciprocating mechanism and brake, substantially as described.

5. The combination in a jack-winding machine of the thread guiding and winding mechanism including an operating shaft; a yarn spool; a cam on the operating shaft, a second shaft mounted so as to be free to oscillate, a plurality of levers connected to the second shaft, a bar connected to one of said levers, a pin in said bar to coöperate with the cam, a paddle mounted to act on the yarn on the spool with automatic take-up means connected between the paddle and the levers, the same being arranged and constructed to decrease the intensity of the pressure exerted by the said paddle upon the yarn on the spool as the volume of yarn on said spool decreases.

6. The combination in a jack-winding machine of the thread guiding and winding mechanism including an operating shaft; the yarn spool, a cam on the operating shaft, a second shaft mounted so as to be free to oscillate, a plurality of levers connected to the second shaft, a bar connected to one of said levers, a pin in said bar to coöperate with the cam, a paddle mounted to act on the yarn on the spool, an adjusting strap connected to said paddle, with automatic take-up means connected between the adjusting strap and said levers, the same being arranged and constructed to decrease the intensity of the pressure exerted by the paddle upon the yarn on the spool as the volume of yarn on said spool decreases.

7. The combination in a jack-winding machine of the thread guiding and winding mechanism including an operating shaft, the yarn spool, a cam on the operating shaft, a second shaft mounted so as to be free to oscillate, a plurality of levers connected to the second shaft, slides adjustably secured to certain of the levers, a bar connected to one of the levers, a pin in said bar to coöperate with the cam, a paddle mounted to act on the yarn on the spool, with automatic take-up means connecting the said slides and the paddles, the same being arranged and constructed to decrease the intensity of the variable pressure exerted by the paddle upon the yarn on the spool as the volume of yarn on said spool decreases.

8. A tension regulating device for jack-winding machines consisting of a cam, means for actuating the same, a shaft, a plurality of levers connected to the shaft, a slide adjustably mounted on each of said levers, a crank lever attached to the shaft, a bar connected to the crank lever, a pin in said bar to coöperate with the cam, a plurality of paddles mounted so as to act upon the yarn on the supply spools of the machine and a tension spring connecting each of said slides with one of the paddles.

9. A tension regulating device for jack-winding machines consisting of a cam, means for actuating the same, a shaft, a plurality of levers connected to the shaft, a slide adjustably mounted on each of said arms, a crank lever attached to the shaft, a bar connected to the crank lever, a pin in said bar to coöperate with the cam, a plurality of paddles mounted so as to act upon the yarn on the supply spools of the machine, an adjusting strap connected to each of said paddles, and a tension spring connecting each of the adjusting straps with one of the slides.

10. In a jack-winding machine for winding bobbins in a series of conical layers, the combination of the thread guiding and winding mechanism including a shaft, means operable from said shaft whereby alternate layers of yarn on the bobbins are wound with a number of closely adjacent turns of yarn while the layers intermediate said close layers are wound with a relatively

few separated turns of yarn, the yarn spool, a brake operative upon the yarn on the spool, connecting mechanism between said brake and the aforesaid operating shaft whereby the brake pressure is varied to maintain a uniform tension upon the yarn during the winding operation, substantially as described.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

GEORGE EUGENE WISSMANN.

Witnesses:
AUGUSTUS B. COPPES,
WM. A. BARR.