Feb. 24, 1953 M. ABBE 2,629,560

TRAVERSE DEVICE

Filed March 18, 1949 2 SHEETS—SHEET 1

Fig. 1

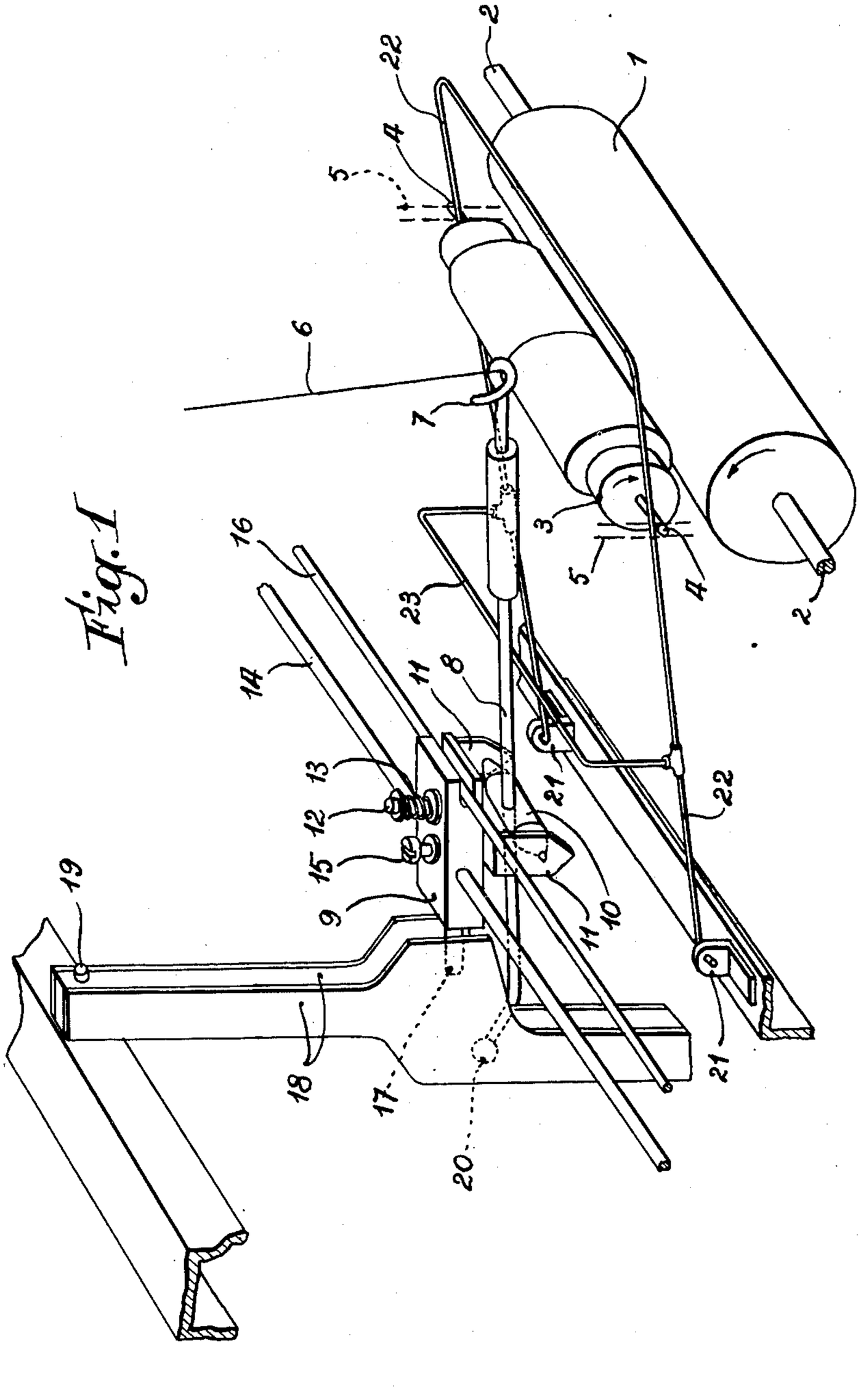

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Fig. 2

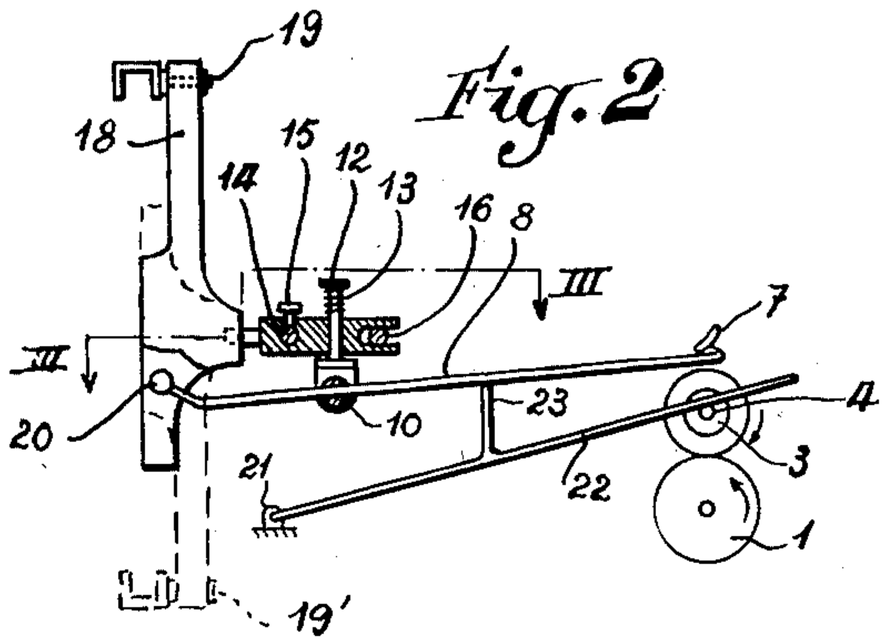


Fig. 3

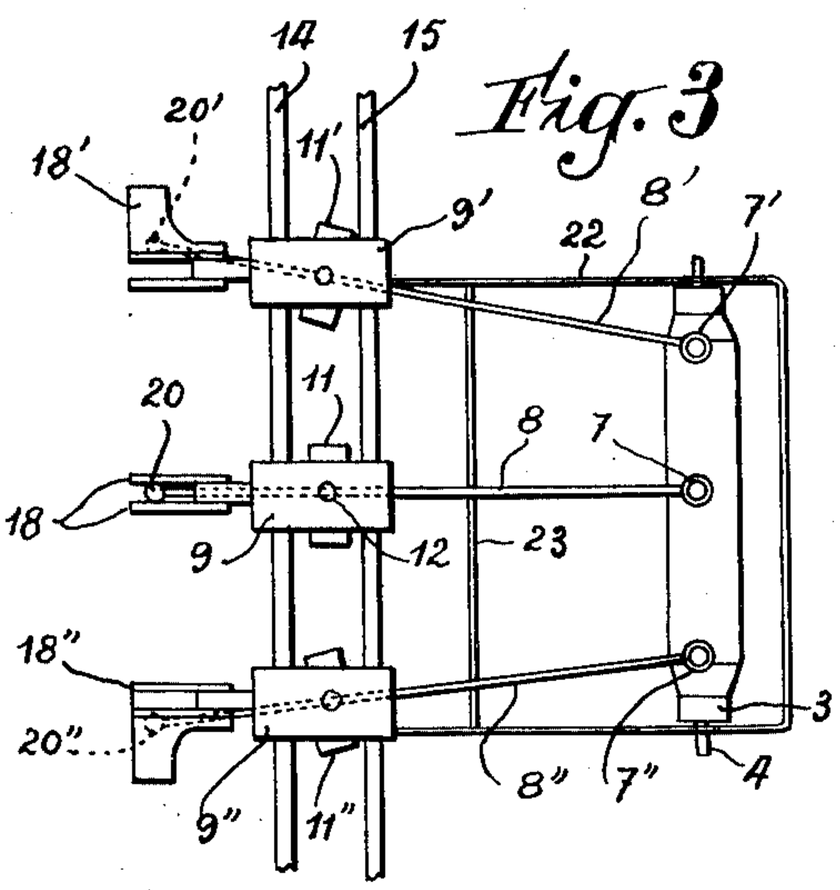


Fig. 4

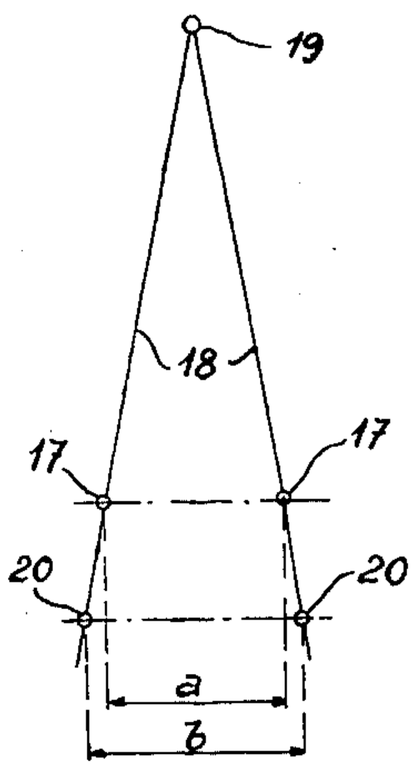


Fig. 5

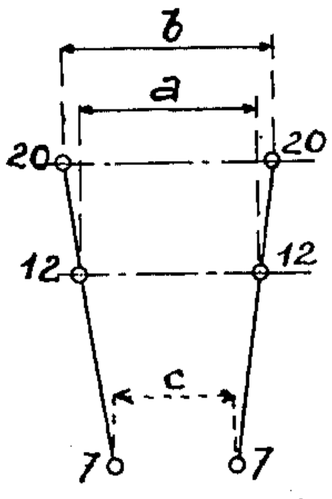


Fig. 6

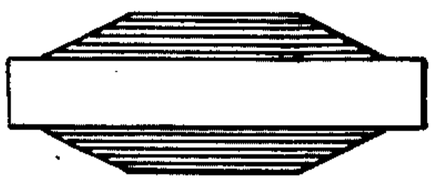
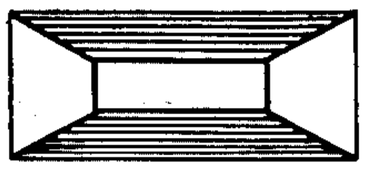


Fig. 7



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UNITED STATES PATENT OFFICE

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TRAVERSE DEVICE

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3 Claims. (Cl. 242—43)

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This invention relates to machines adapted for winding threads or yarns into bobbins with conical ends.

In such machines the required variation in the stroke of each individual thread guide is generally ensured by an appropriate gearing disposed at one end of the machine and which simultaneously operates all the thread guides of the machine, the said gearing being responsive to the number of rotations of the machine shaft. In another known construction the stroke controlling gear is actuated by a member in direct contact with each bobbin itself.

A first object of this invention is to provide for the control of the stroke of the thread guide a mechanism which comprises no member in frictional engagement with the wound mass of threads and liable to damage the same.

Another object of my invention is a winding machine wherein the thread guide is carried by an arm which is orbitally pivoted by one of its points to a carriage reciprocated in parallel relation to the bobbin axis, while another point of the said arm slidably engages a lever pivoted about an axis substantially parallel to the mean position of the arm and oscillated in unison with the carriages, in such a manner that the amplitude of the oscillation of the second-named point of the arm varies as the thread guide arm becomes more inclined, means being provided for control of the inclination of the said arm as the diameter of the bobbin increases.

Control of the inclination of the thread guide arm might be ensured by causing the guide to directly rest on the bobbin, whereby it would raise as the bobbin increases in diameter. But of course this arrangement has the drawback that friction of the guide may damage delicate threads.

This is avoided in accordance with my invention by providing a light frame pivoted to the fixed frame of the machine and resting on the protruding ends of the bobbin spindle, and by supporting the thread guide arm by a cross-bar appropriately fixed on this light frame in parallel relation to the bobbin spindle. When the diameter of the bobbin (which rests on the usual driving drum) increases, its spindle moves upwardly and the light frame is raised together with its cross-bar which in turn raises the thread guide arm.

In the annexed drawings:

Fig. 1 is a general perspective view diagrammatically showing the detail of a machine established in accordance with my invention.

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Fig. 2 is a vertical transverse section thereof.

Fig. 3 is a horizontal section taken along line III—III of Fig. 2, in which the thread-guide and related parts are shown at three different positions.

Figs. 4 and 5 are two explanatory diagrams.

Figs. 6 and 7 illustrate two types of bobbins which may be obtained by means of my improved machine.

The machine illustrated comprises a driving drum 1 carried by a shaft 2 which extends on the whole length of a frame on which a number of similar winding machines are mounted side by side. Shaft 2 rotates continuously. Drum 1 supports the bobbin 3 which is being wound and the spindle 4 thereof protrudes at both ends to engage vertical guides 5 wherein it may rotate and move vertically. The thread 6 to be wound passes through a guiding eyelet 7 adapted to reciprocate along the length of bobbin 3 to ensure regular formation of the successive layers of thread.

In actual practice spindle 4 is carried by ball bearings within a tube forming the core of bobbin 3, in such a manner that the said spindle may remain substantially immovable within guides 5 notwithstanding rotation of bobbin 3, which avoids friction in the said guides.

It will be understood that to obtain conical ends for bobbin 3 the stroke of the thread guide 7 must vary as the bobbin diameter increases.

The thread guide 7 is secured at the end of an arm 8 which at its means position (i. e. when thread guide 7 is in front of the middle point of bobbin 3) is perpendicular to the bobbin axis. Arm 8 is connected with a longitudinally slidable carriage 9 through a universal joint device which, in the example illustrated, comprises a cylindrical member 10 fixed at right angles at the end of arm 8, the said member being horizontally pivoted within an inverted U-shaped part 11 formed with a vertical pin 12 rotatable in carriage 9. Pin 12 is acted upon upwardly by a small spring 13 which ensures slight friction between carriage 9 and part 11 to damp undesirable vibrations.

Carriage 9 is fixed on a longitudinal rod 14 extending along the full length of the machine and which is reciprocated by any appropriate mechanism, such as the conventional heart-shaped cam. A pressure screw 15 ensures fixation of carriage 9 on rod 14 while another rod 16, parallel to rod 14, forms a guide for the said carriage.

Carriage 9 is provided with a horizontal tail portion 17 directed in opposite direction with respect to bobbin 3 and which engages between two cheeks 18 forming a lever unit pivoted at its upper end at 19 about a horizontal axis perpendicular to the axis of bobbin 3.

Arm 8 extends beyond carriage 9 and it terminates into a spherical end 20 which fits slidably between cheeks 18.

The frame of the machine is provided with two lugs 21 disposed along a longitudinal axis and forming a pivot for a light frame 22 made of steel wire. The two sides of this frame rest on the protruding ends of the bobbin spindle 4. Frame 22 is formed with an upper longitudinal rod 23 on which arm 8 is slidably supported in such a manner that the thread guide 7 is disposed close to the outer layer of threads on bobbin 3, but without contacting the latter.

The respective dimensions of the parts are such that the vertical displacements of guide 7 due to the increase in diameter of bobbin 3 are twice those of spindle 4, which implies that the axis of frame 22 in lugs 22 should be behind the axis of member 10 with respect to bobbin 3.

The operation of the machine described is as follows:

When carriage 9 is reciprocated by rod 14, its tail portion oscillates the lever formed by cheeks 18 about its pivot 19. The spherical end 20 of arm 8 is thus reciprocated but the amplitude or stroke of this movement is of course dependent of the distance between the said spherical end and pivot 19. If this distance is exactly equal to the distance between carriage 9 and the said pivot, the amplitude of the reciprocating motion of end 20 is exactly equal to the amplitude of movement of carriage 9 and therefore arm 8 remains parallel to a fixed transverse direction. If on the contrary, as indicated in Figs. 1 and 2, end 20 is farther from pivot 19 than tail 17, the amplitude of the said end is greater than the amplitude of carriage 9 and arm 8 becomes oblique towards the ends of its stroke, as it will be easily understood from Fig. 3 wherein the said arm has been shown at three positions, viz. the mean or middle position and each of the extreme positions. These three positions are respectively referenced 8, 8′ and 8″ and the same kind of reference numerals has been used for the other parts.

Figs. 4 and 5 diagrammatically illustrate the preceding explanations. In the first one if *a* designates the amplitude of the movement of tail 17 (i. e. of rod 14), the amplitude *b* of the movement of end 20 is greater. The second figure shows that when end 20 is given a reciprocating amplitude *b*, while carriage 12 is only given the amplitude *a*, arm 8 is caused to take an oblique position as it moves from its mean position, in such a manner that the amplitude *c* of the thread guide stroke is smaller than *a*. And it is easily understood that *c* decreases as *b* increases, while *a* remains constant.

Of course the same would be true if end 20 were nearer of pivot 19 than tail 17. In such a case *c* would be greater than *a* but it would still decrease as *b* would increase.

As bobbin 3 receives more thread, its diameter increases and its spindle 4 moves upwardly within its guides 5. Consequently the thread guide 7 also moves upwardly but twice more rapidly, as above explained, in such a manner that the said guide always remains in the immediate vicinity of the outer layer of thread on bobbin 3 without however contacting the latter.

This upwards movement of thread guide 7 of course causes rotation of arm 8 within member 11 about the horizontal axis of member 10, whereby end 20 is caused to move downwardly between cheeks 18. The said end thus moves away from pivot 19 and its reciprocating amplitude *b* increases, which leads to a corresponding decrease of the amplitude *b* of the reciprocating stroke of the thread guide. The amplitude of the reciprocating movement of the thread guide thus decreases as the bobbin increases in diameter. There is thus finally obtained a biconical form for the winding of thread, as indicated in Fig. 6.

My improved machine also permits to obtain bobbins of the kind illustrated in Fig. 7, wherein the biconical ends are formed inwardly. It will be understood that for such a result it is only necessary that the variation of the amplitude of the thread guide stroke should be the reverse with respect to the above. This is easily obtained by inverting the lever formed by cheeks 18, i. e. by pivoting same about a pivot 19′ (Fig. 2) disposed at the opposite position with respect to the above described pivot 19.

I claim:

1. A winding machine for threads, yarns and the like, comprising in combination a substantially horizontal rotating drum adapted to support and to frictionally drive a bobbin provided with an axial spindle; vertical guiding means above said drum for said spindle; a reciprocable thread guide adapted to be reciprocated along the length of said bobbin substantially at the upper part thereof; an arm to carry said thread guide, said arm being substantially perpendicular to the axis of said bobbin when said thread guide is at the mean position of its stroke; a carriage to which said arm is orbitally pivoted, said carriage being reciprocated in a direction substantially parallel to the axis of said bobbin; a frame pivoted along an axis parallel to the axis of said bobbin and resting on the ends of said bobbin spindle; a transverse bar carried by said frame and adapted to slidably support said arm, said bar being so disposed on said frame that said thread guide remains in close but non-contacting relation with respect to the outer layer of threads or yarns on said bobbin irrespective of the diameter of the latter; a lever oscillatable in a plane substantially perpendicular to the mean position of said arm; means to oscillate said lever in unison with said carriage; and means on said lever to orbitally and slidably engage said arm at a distance from the connection thereof with said carriage.

2. In a winding machine as claimed in claim 1, said arm having its end remote from said thread guide in the form of a sphere and said lever being formed of two cheeks disposed in two planes parallel to each other and to the geometrical axis about which said lever is pivoted, said cheeks slidably engaging the spherical end of said arm.

3. In a winding machine as claimed in claim 1, said lever being formed of two cheeks disposed in two planes parallel to each other and to the geometrical axis about which said lever is pivoted, and said carriage being provided with a cylindrical tail parallel to said geometrical axis and slidably engaged between said cheeks.

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