Dec. 9, 1958 F. SCRAGG 2,863,278

YARN WINDING AND TWISTING MACHINE SPINDLES

Filed April 6, 1956

Fig. 1.

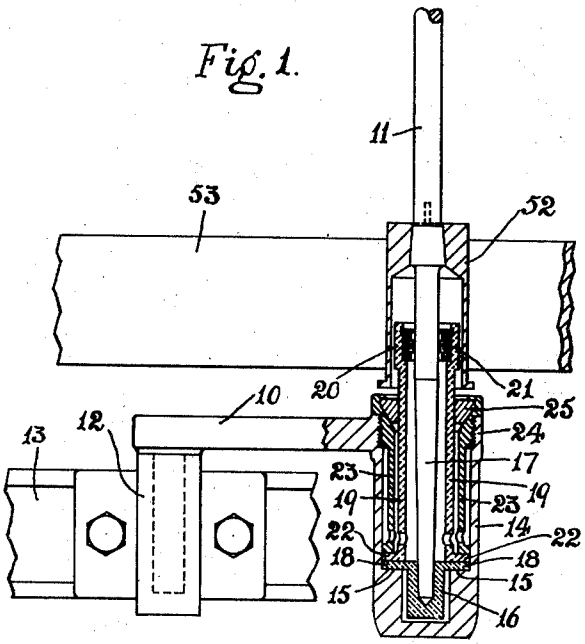


Fig. 3.

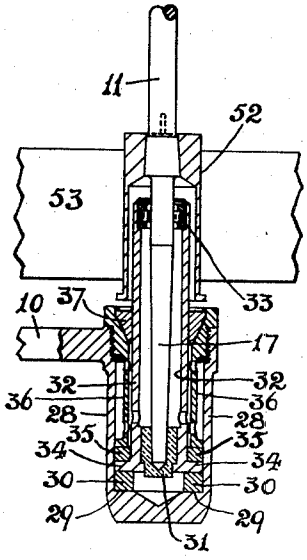


Fig. 2.

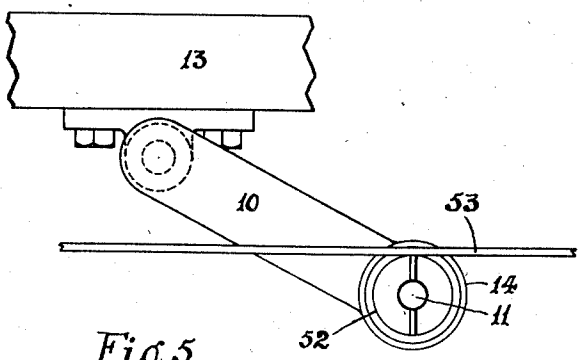


Fig. 4.

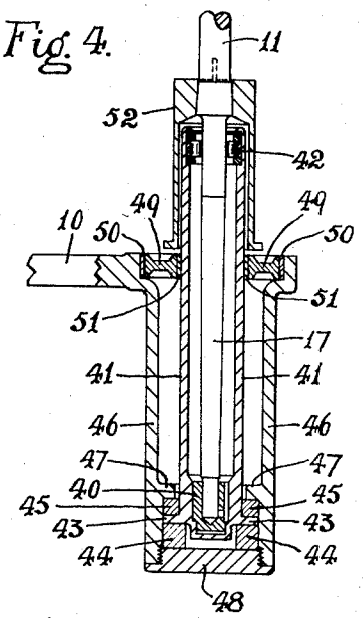
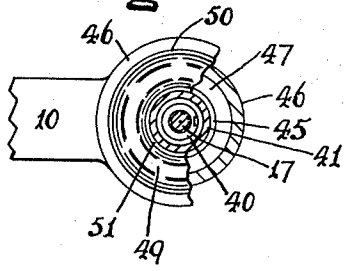


Fig. 5.



Frederick Scragg, Inventor

by Mason, Parker, Miller & Stewart

Attorneys

United States Patent Office 2,863,278
Patented Dec. 9, 1958

2,863,278

YARN WINDING AND TWISTING MACHINE SPINDLES

Frederick Scragg, Macclesfield, England, assignor to Ernest Scragg & Sons Limited, Macclesfield, England, a corporation of England

Application April 6, 1956, Serial No. 576,614

1 Claim. (Cl. 57—135)

This invention relates to improvements in yarn winding and twisting machines of the kind in which the spindles are mounted vertically in bearings in the end of a pivoted arm which is moved about its pivot to move a driving pulley on the spindle into and out of engagement with a driving belt. A yarn package is placed on the spindle which is rotated as the yarn is withdrawn therefrom. If the yarn package is out of balance considerable vibration is set up as the spindle rotates and as the lower end of the spindle rests in a foot step bearing it has been proposed to mount this foot step bearing so that it can float or move against the action of a spring so that the spindle can adjust itself to allow the package to rotate about an axis which passes through the centre of gravity of the package to prevent vibration. Whilst this reduces the vibration set up by an out of balance package it introduces considerable wear on the foot step bearing and causes flexing of the blade or lower end of the spindle which also causes a certain amount of vibration. The object of the present invention is to provide a simple mounting for the bearings of the spindle which will permit of it adjusting itself to permit of an out of balance package running free of vibration, which reduces the wear to the minimum and permits of the spindle being run at a higher speed.

According to this invention the lower end of the spindle is carried by bearings mounted in a cup on the outer end of an arm pivoted at its other end to the machine frame, the bearings comprising a foot step bearing in which the lower end of the spindle rests and a roller bearing in the upper end of a resilient sleeve secured at its lower end to the cup. The upper end of the foot step bearing may be formed with a flange which rests on a seat formed in the cup and the lower end of the resilient sleeve is provided with a flange which rests on the flange on the foot step bearing and the two flanges are secured in position by a screw threaded sleeve which screws into the cup and down on to the flange on the resilient sleeve. Alternatively the foot bearing may be located in the bottom of the resilient sleeve and the flange on the latter located between two resilient washers which are held down by the screw threaded sleeve, or held up to a flange by a cap screwed into the bottom of the cup.

The invention will now be more particularly described with reference to the accompanying drawings, in which:

Fig. 1 is a sectional elevation and

Fig. 2 a plan of a spindle mounted according to this invention.

Fig. 3 is a sectional elevation showing a modified form of mounting.

Fig. 4 is a sectional elevation and

Fig. 5 a sectional plan of a further modified form of mounting for the spindle.

Like numerals indicate like parts throughout the drawings.

In one method of carrying out this invention as shown in Figs. 1 and 2 the arm **10** which carries the spindle

11 is pivoted at one end in the usual manner to a bracket **12** secured to the machine frame **13**. The free end of the arm **10** carries a cup or sleeve **14** which is closed at its lower end. Disposed a short distance from the bottom of the cup is an annular seat **15** to carry a foot step bearing **16** for the lower end of the spindle blade **17**. For this purpose the foot bearing **16** is formed with a flange **18** on its upper end and the underside of the flange **18** rests on the seat **15**. Disposed above the foot step bearing **16** is a resilient sleeve **19** of suitable length and thickness formed with an enlarged part **20** having a recess therein at its upper end to house a roller or needle bearing **21** for the upper end of the spindle blade **17**.

In order to hold the resilient sleeve **19** in position it is formed with a flange **22** at its lower end which rests on the flange **18** on the foot step bearing **16** and the two flanges are secured together by a sleeve **23** which is screw threaded on its periphery and engages in a screw threaded part **24** on the inside of the cup or sleeve **14** above the seat **15** and screws down on to the flange **22**.

The resilient sleeve **19** is provided with oil holes therein so that oil placed in the cup can pass into the interior of the resilient sleeve to lubricate the spindle bearings. It will be seen that the resilient sleeve is secured in position in the cup by its lower end so that the resilience of the sleeve allows the upper bearing of the spindle blade to move laterally of the normal axis of the sleeve so that an out of balance package can rotate about an axis which passes through its centre of gravity, this result being automatically attained when the spindle reaches a certain speed of revolution.

The upper end of the retaining sleeve **23** is provided with a felt or rubber washer **25** which fits round the resilient sleeve **19** and whilst allowing the resilient sleeve to move it helps to damp out any vibration due to an out of balance package on ihe spindle and furthermore prevents excessive movement of the resilient sleeve from an out of balance package as the spindle is started up from the rest and until the spindle reaches the speed at which it automatically assumes its running position.

The sleeve **19** is made of plastic material having a certain amount of resiliency and nylon is a suitable material for the purpose. The foot step bearing **16** may also conveniently be made of the same substance which has both wear resisting and anti-frictional properties.

In the preferred method of carrying out this invention shown in Fig. 3 the pivoted arm **10** which carries the spindle **11** is formed with a cup **28** which is closed at its lower end and provided with a seat **29** at the bottom of the cup to receive a damping bush **30** which may conveniently be made of rubber and fits into the lower end of the cup. The spindle bearings comprise a foot step bearing **31** at the lower end of a sleeve **32** and a roller or needle bearing **33** at the upper end of the sleeve **32**. The sleeve **32** may be made of steel and the lower end of the sleeve is located in the cup **28** on the pivoted arm **10**. In order to hold the bearing sleeve **32** in position it is formed with an outwardly extending flange **34** at its lower end which rests on the damping bush **30** in the bottom of the cup **28**. Disposed on the upper side of the flange **34** is a second damping bush **35** which fits into the inside of the cup **28** and may also be made of rubber. This second damping bush **35** is held down on to the flange **34** on the bearing sleeve **32** by the lower end of a retaining sleeve **36** which is concentric with the bearing sleeve **32** and screws into the cup **28** so that the bearing sleeve **32** is resiliently held in position in the cup **28** sufficient clearance being left between the two sleeves to allow for any movement of the bearing sleeve.

The bearing sleeve **32** is provided with oil holes therein so that oil placed in the cup **28** can pass into the

interior of the bearing sleeve to lubricate the bearings carried thereby.

The upper end of the retaining sleeve **36** carries a rubber or felt washer **37** which fits round the bearing sleeve **32** and whilst allowing the bearing sleeve to move it also helps to damp out any vibration due to an out of balance package on the spindle and furthermore prevents excessive movement of the bearing sleeve from an out of balance package as the spindle is started up from rest and until the spindle reaches the speed at which it automatically assumes its running position.

In the method of carrying out this invention as shown in Figs. 4 and 5, the lower end of the spindle blade **17** is disposed in a bearing **40** in the lower end of a sleeve **41** and is held centrally of the sleeve **41** by a roller or needle bearing **42** disposed at the upper end of the sleeve **41**. A flange **43** is provided on the exterior of the sleeve **41** at the lower end thereof. The flange **43** is clamped between two resilient washers **44, 45** disposed at the bottom of a cup **46** on the end of the pivoted arm **10**. The uppermost washer **45** engages with the underside of a flange **47** on the inside of the cup **46** and is held in engagement therewith by a member **48** which engages with the lowermost washer **44** and screws into the lower end of the cup **46**.

The movement of the sleeve **41** due to an out of balance package on the spindle **11** is damped by a damping member **49** disposed between the sleeve **41** and the upper end of the cup **46**. The damping member **49** comprises a diaphragm of oil resisting rubber disposed between the sleeve **41** and cup **46**. The diaphragm is provided with outer and inner metal rings **50, 51** to which the rubber is secured by chemical bonding or other means. The outer metal ring **50** is secured to the cup **46** and the inner ring grips the sleeve **41**. It will be seen that the diaphragm exerts a damping action on the sleeve **41** and the minimum damping action is provided when the inner and outer

ring are disposed in the same plane as shown in Fig. 4. By moving the inner ring **51** longitudinally of the sleeve **41** tension will be applied to the diaphragm and its damping action increased, the increase in the damping action depending on the distance the inner ring **51** is moved longitudinally of the sleeve.

The spindle **11** is provided with the usual driving pulley **52** thereon and is moved into and out of engagement with the driving belt **53** in well known manner to put it into and out of operation.

With the bearings of a spindle blade mounted as described the vibration from an out of balance package is reduced to such an extent as to be almost imperceptible at normal spindle speeds and permits of the spindle being run at a higher speed than has hitherto been possible with an out of balance package thereon, with a reduction in the wear on the foot step bearing so that the oil in the cup remains free from swarth.

What I claim is:

A mounting for a belt driven spindle comprising a pivoted arm, a cup on the outer end thereof, a sleeve in the cup, a foot step bearing at the lower end of the sleeve and an antifriction bearing at the upper end of the sleeve to carry the spindle, a flange on the lower end of the sleeve, resilient washers above and below the flange, said cup having a portion providing a seat for the lower washer, a retaining sleeve to screw into the cup and down on the uppermost resilient washer, and a damping washer between the two sleeves.

References Cited in the file of this patent

UNITED STATES PATENTS

2,674,477	Varga et al.	Apr. 6, 1954
2,699,033	Bell	Jan. 11, 1955
2,704,946	Gray et al.	Mar. 27, 1955
2,724,945	McGhee	Nov. 29, 1955